

Battle of the Smartphones!
Treo 650 vs. Audiovox PPC-601:
Only one will leave the ring!

Intel Goes Dual-Core!
Will AMD eat Pentium 4 dust,
or speed up its own DC effort?



Test Your High-Tech Smarts
Our Geek Quiz will reveal just
how tech-savvy you really are!

MAXIMUM PC

MINIMUM BS • APRIL 2005

HOW TO PICK THE BEST PC PARTS

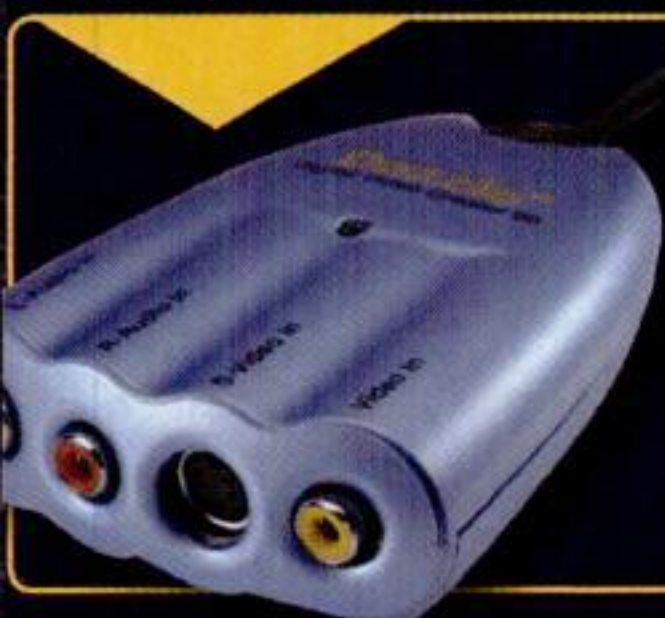
- Videocards
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- Motherboards
- CPUs
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- Speakers

*Your definitive guide to the
absolute best components!*

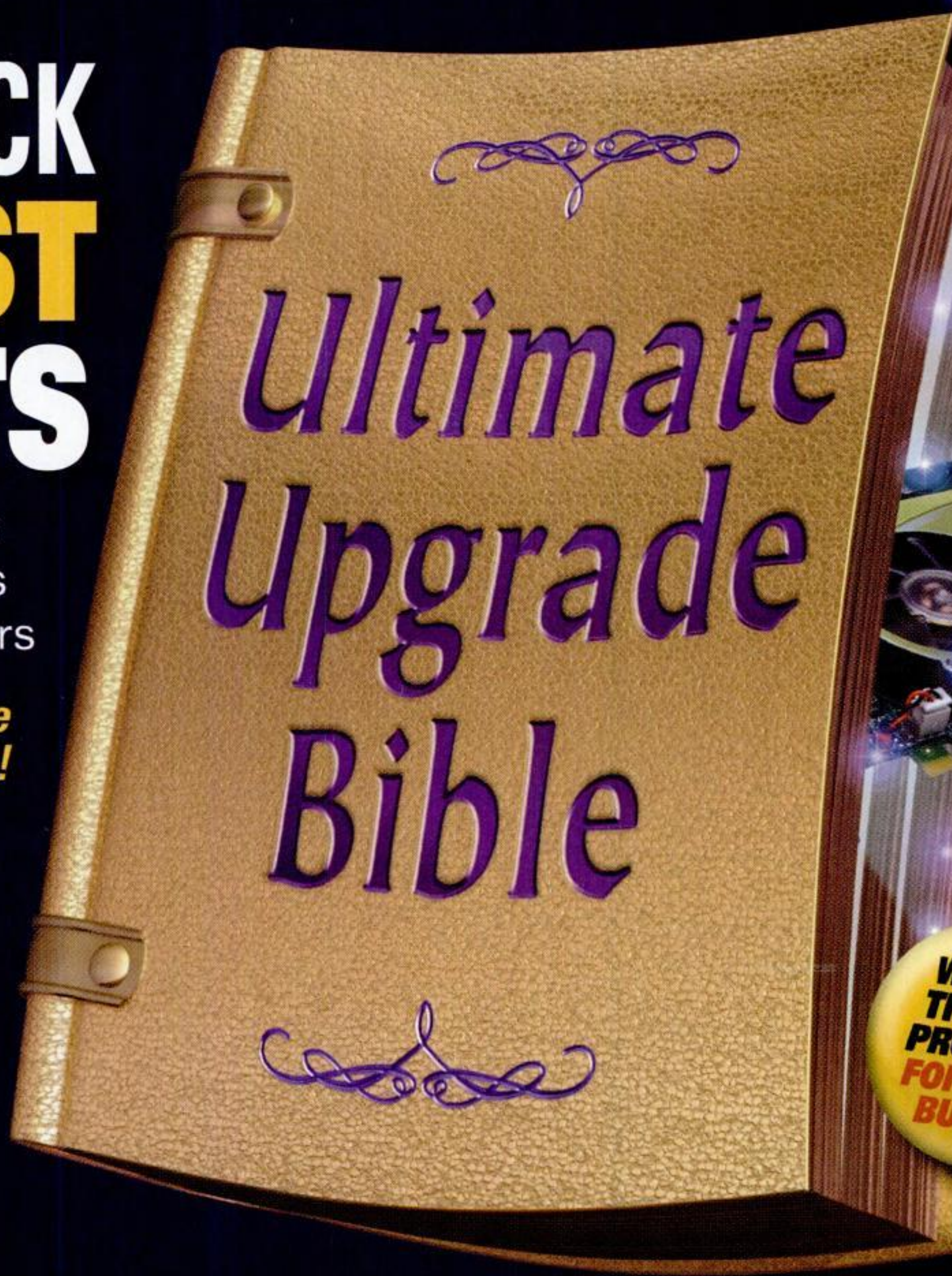
PLUS!

MOBO MÉNAGE À TROIS:
HANDS-ON REVIEWS OF
3 NEW MOTHERBOARDS

IT'S SHOWTIME!



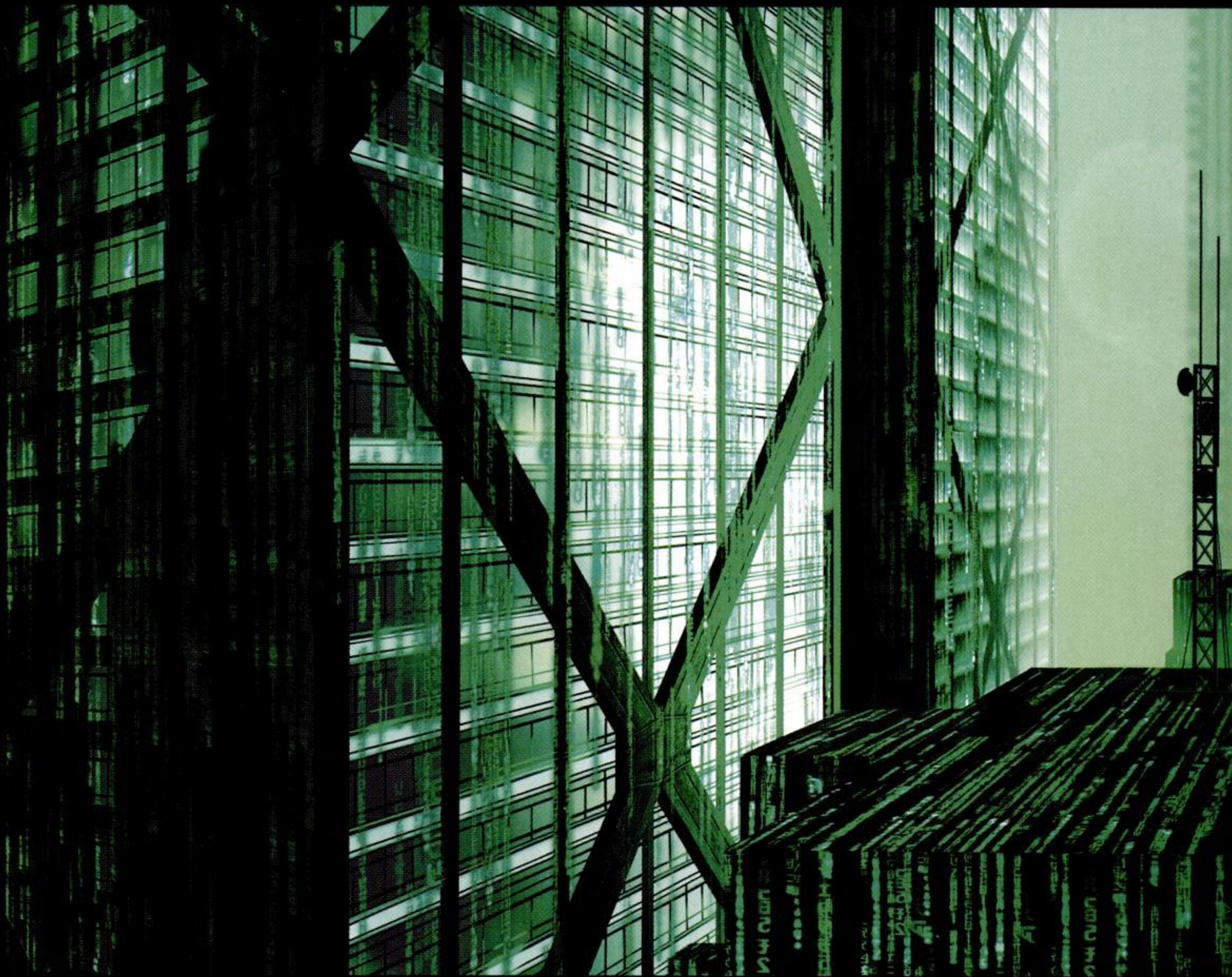
*We review the top video-
capture and editing tools
Edit your home movies—
We show you how!*



**WE PICK
THE BEST
PRODUCTS
FOR EVERY
BUDGET!**



REVIEWED! The best music-streaming system ever!





The Matrix Online is the future of the Matrix, picking up right where the trilogy left off. The revolution is over, but within the Matrix a secret war still rages—a war of control between the Machines, the Exiles, and the people of Zion. Come join the continuing storyline of the Matrix where you decide who to oppose and what to believe. Only your courage and perseverance can protect the legacy of Neo's sacrifice. Jack in.

- ▶ Explore every inch of *The Matrix: Mega City*—the most realistic urban environment of any MMO. The entire city, including every room of every building, is in play.
- ▶ Defeat your enemies using devastating martial arts maneuvers and gunplay. Breakthrough MMO technology produces rich animations and hyper-kinetic battle sequences.
- ▶ Escape character regret. Reconfigure your character's abilities and performance on demand.
- ▶ Communicate with people in and out of the game in real-time using AOL® Instant Messenger™ technology.





THE MATRIX IS ONLINE. JACK IN NOW.

T H E
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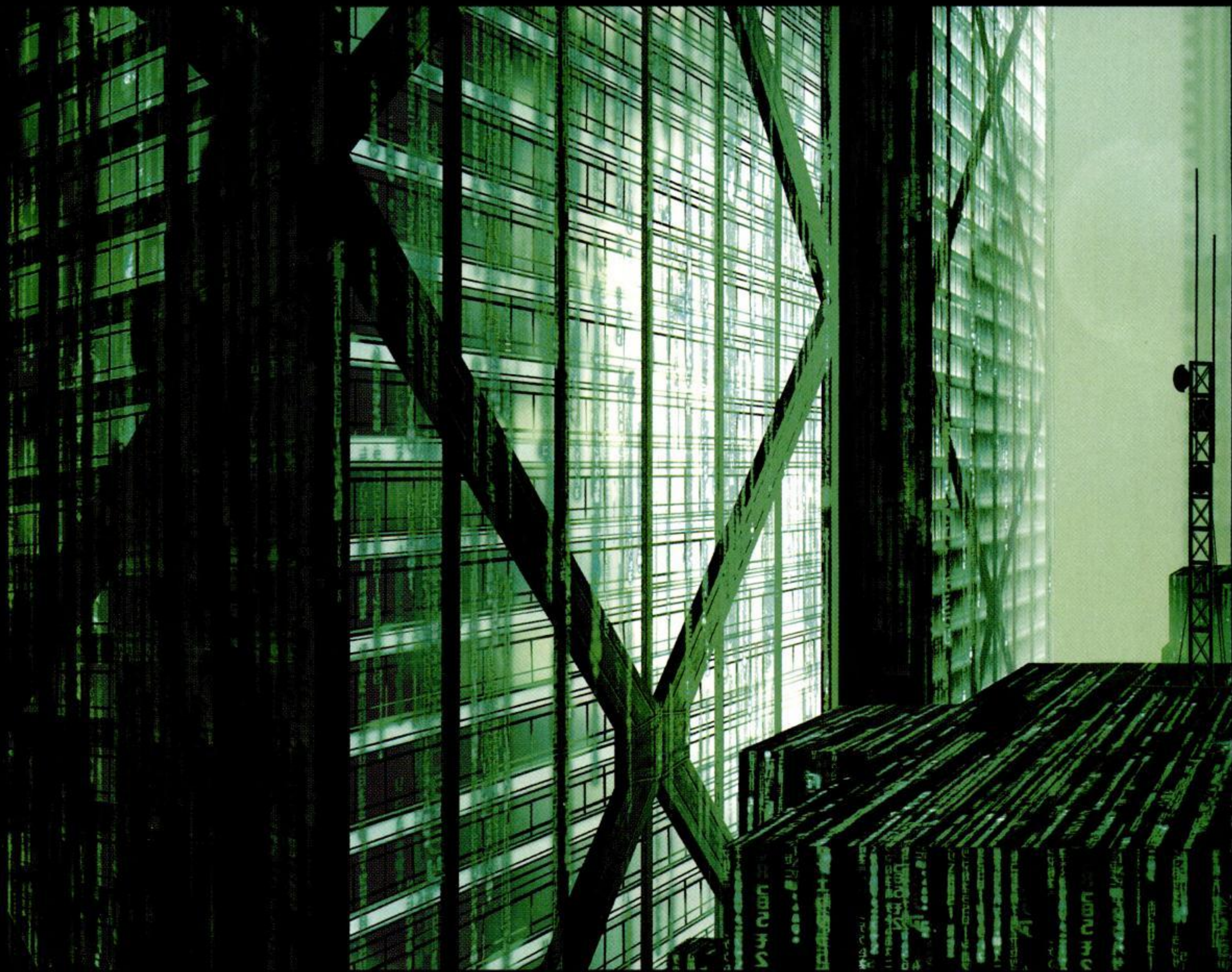
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- ▶ Escape character regret. Reconfigure your character's abilities and performance on demand.
- ▶ Communicate with people in and out of the game in real-time using AOL® Instant Messenger™ technology.





I know why, night after night,
you sit in front of your computer.



This One



XFQF-E1P-6BS8



TERMINAL ALERT _____ HIGH

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TEEN
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—Gen. Barry McCaffrey, USA (Ret.)

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Release Notes

Minority Report

Am I the only person in the world who doesn't like MP3 files? I like the *idea* of MP3 files. What's not to like about carrying thousands of tunes in the palm of your hand? Or of buying music online and having it delivered that instant? Or streaming music from a single source to any room in your house without using wires?

No, I like the idea of MP3 files just fine. It's the *sound* of MP3 files that I don't like.

I'm a lapsed musician, but I've never considered myself part of the "golden ear" crowd. I would never spend \$20,000 on an ultra high-end amplifier—and even more for speakers—even if I could afford to (the salaries of journalists and musicians aren't far apart). But I do buy the best audio equipment I can; and MP3s, frankly, sound like dog-doo.

MP3s don't sound as crisp, as clear, or as faithful to the original performance as music played from CD. And have you heard the sonic splendor that 96kHz/24-bit DVD-Audio and Super Audio CD discs are capable of? Play me an MP3

that can match *those* formats, and I'll rip my entire CD collection the next weekend.

I've really tried to like MP3s. I took the Sonos Digital Music System for a test drive, and I thoroughly appreciate what Sonos has wrought. These guys clearly care about audio, and they obviously know a thing or two about networking. But the Sonos system can't reproduce what's not there in the first place.

I know my opinion of MP3s is in the extreme minority, but here's what I don't understand about everyone *else's* opinion: If we strive to achieve the best performance from our PCs by upgrading our videocards every six months, our CPUs every 18 months, our displays every couple of years, and every other component on some schedule in between, why is it perfectly acceptable to not only tolerate, but to openly celebrate technology that makes music sound worse than it did in 1982?

—MICHAEL BROWN

THE EIC'S PICKS

THE ULTIMATE UPGRADE BIBLE

No sacred cows were spared in our irreverent look at hardware upgrades. You need to read this story even if you just bought the fastest, most tricked-out PC on the planet. [Page 28](#)

SONOS DIGITAL MUSIC SYSTEM

My opinion of MP3s notwithstanding, this is the best music-streaming system I've ever heard. [Page 78](#)

THE GEEK QUIZ

You'll laugh, you'll cry, you'll kiss two hours goodbye. Don't miss this opportunity to mind-meld with your inner geek. [Page 43](#)

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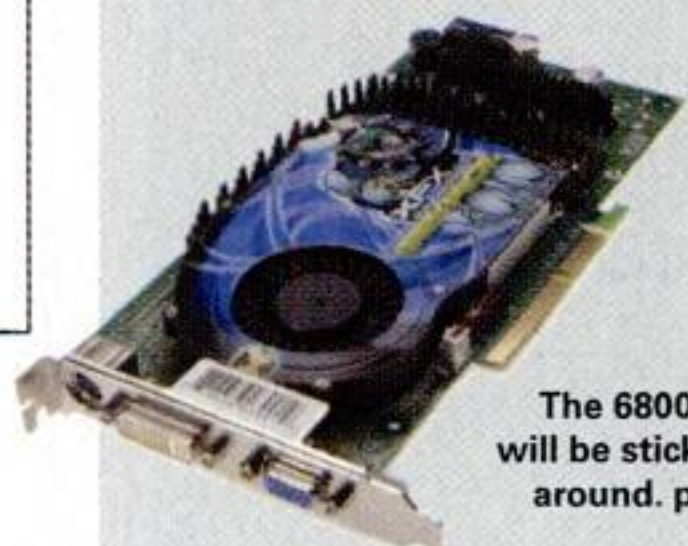
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GAMING



**OFFICIALLY, THEY'RE CALLED
"ACTIVITY-INDICATING LEDs."**

**Unofficially,
we just call 'em
"bling bling."**

**"Crucial Ballistix Tracer memory
is a case modder's dream!"**

—PC Stats

Serious enthusiasts know that memory performance is a numbers game. We think you'll agree that Crucial® Ballistix™ Tracer™ PC4000 (DDR500) high-performance memory really adds up, with timings as low as CL 2.5-4-4-8 and a bit rate of 4.0ns/500 MT/s.....

You're still staring at the picture, aren't you? Oh, *alright*. We'll skip straight to the bling thing.

Winkin', blinkin', and mod



Like you didn't already notice, Ballistix Tracer memory features a black PCB, black integrated heat spreaders, two rows of activity-indicating LEDs, and ground effects lights. The 16 "chasing" red and green LEDs atop the module circulate at varying speeds proportional to usage, courtesy of a custom-designed circuit that relays bus activity to the LEDs, allowing them to accurately reflect usage of each module. The eight blue ground effects LEDs emit a constant glow near the pins.

It's the award-winning "oomph!" of our Ballistix ultra high-performance memory line coupled with some pretty nice eye candy for your case. You get not only rock-solid stability and performance, but also the revolutionary visual effects that identify which games and other applications make your Ballistix Tracer memory work the hardest. Plus, Ballistix Tracer modules are the same size as regular Ballistix memory, so you get the *bling* without the *bulk*.

And for those of you with cutting-edge DDR2 systems, Ballistix Tracer is also available in DDR2 PC2-5300!

**To see Ballistix Tracer in action and find the module
that's right for your system, visit**

www.crucial.com/tracer

**We could go on and on about how cool it is, but
we thought we'd let these folks do it instead.**



"This memory is stable, reliable, & has blistering performance! Let's not forget the 'bling bling' factor; 16 active (8 red, 8 green) LEDs & 8 blue ground effect LEDs."

"I can say that if you're a case modder, or looking for a bit more attention at local LANs for your custom-built computer, you're sure to get some heads turning with these in your case, and at no loss of performance. I am giving the Crucial Ballistix PC4000 Tracer modules 9.5 out of 10 and the OCMoDShop seal of approval."



"If you're a gamer the Crucial Ballistix Tracer memory is up to the challenge... Crucial Ballistix Tracer memory is a case modder's dream! It will surely draw some attention at LAN parties."

Ready to add some flash appeal to YOUR rig?

We make it easy to find the right Ballistix Tracer memory to trick out your case. While other memory sellers might offer a cumbersome list of compatible processors and motherboards, Crucial provides the award-winning Crucial® Memory Advisor™ tool, an easy-to-use, searchable memory database. In just three clicks, our Memory Advisor tool finds exactly the right Ballistix Tracer module for you—compatibility guaranteed, or we'll refund the price of the incompatible module.

And every Ballistix Tracer module comes with Crucial's top-notch customer support, free technical support, lifetime limited warranty, and free shipping (for a limited time) on qualified orders within the contiguous U.S.

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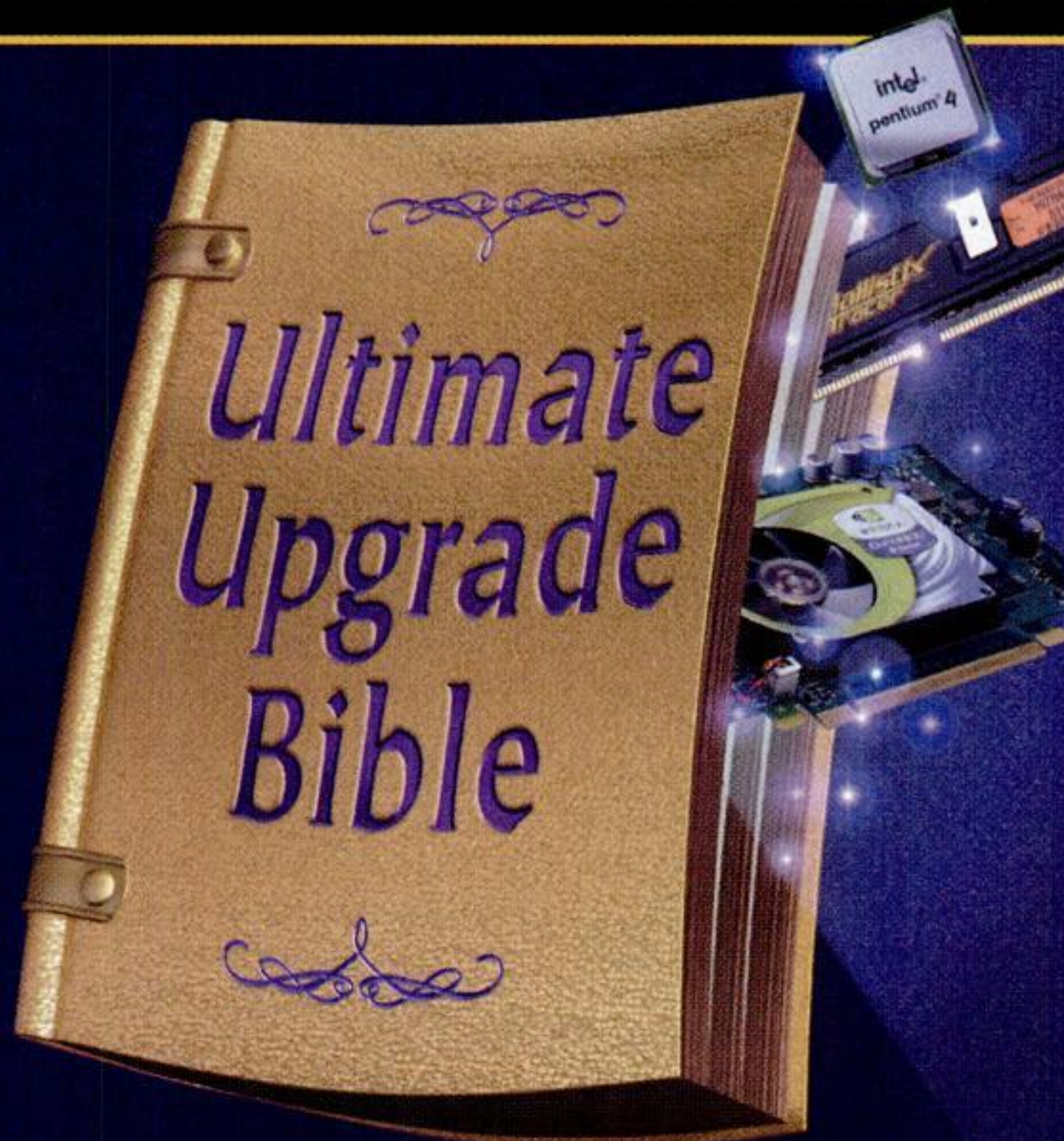
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Less talk, more rock. Show us what you really know in this year's annual test of PC wits!

52 Capture, Edit, Burn

Our complete guide to turning your analog videotapes into entertaining, long-lasting DVDs.



In/Out

You write,
we respond

OPEN-SOURCE OR OPEN SORES?

I understand that you like products such as Linux and GAIM because they're alternatives to commercial software and they're free. But you fail to mention a huge downside to open-source software distributed under the GNU general public license (GPL). There is nothing worse than a person with half a brain looking at the code and finding a vulnerability to exploit. I really think everyone is going overboard with the whole open-source idea.

—SEAN GALLARDY

EXECUTIVE EDITOR WILL SMITH

RESPONDS: Well, Sean, this is one of the most common arguments against using open-source software; but for the most part, it's a fallacy. What you need to remember is that while naughty folks are digging through the code looking for exploits, there are an equal number of good guys poring over the same source code looking for bugs and errors that leave the app open to exploit. Furthermore, the open-source developers are very proactive about fixing any vulnerabilities that do show up; they're much more responsive than corporate closed-source developers. Besides, if closed-source apps are inherently safer, why are hundreds of exploits discovered in Microsoft applications every year?

WATERSPORTS

I know you get a ton of mail about articles people think you

also have a number of friends who want to try water cooling to resolve noise issues, but information on the net is either scarce or just hard to find.

—AARON COLONA

ASSOCIATE EDITOR JOSH NOREM

RESPONDS: We feel your pain, Aaron, and that's why there's a huge water fight going on in the Lab at this very moment. We're testing the best water-cooling kits on the market to measure ease of installation, overclocking potential, noise level, and more. Which kit will take our 3.6GHz test bed to 4GHz—and beyond? Can a water-cooling solution do that and be absolutely quiet? Is it worth the cost? We'll publish our findings next month!

A NIGHT AT THE OPERA

I'm getting pretty sick and tired of all the *Firefox* this, *Firefox* that. *Opera* has been around for years and has improved greatly over the past few releases. I particularly like the option for people—like me—who have slow Internet connections; it turns off all graphics, so web pages load quicker. It also has tabs, and it blocks all or selected pop-ups.

—TODD HAUGEN

I'M GETTING PRETTY SICK AND TIRED OF ALL THE FIREFOX THIS, FIREFOX THAT.

should write, but I'm going to add mine to the list anyway. I've been a subscriber for more than a year, and I can't remember you doing any how-to stories on water cooling. I have a clear acrylic case, and I'm having some issues finding a setup that will work for me. I

MOVING INDOORS

I eagerly read your reviews of external drives, looking for a frugal storage option for my laptop. A 40GB internal laptop drive was considered adequate a couple of years ago, but I'm now

down to the last eight percent of available storage on mine. I've been researching external enclosures that use Oxford bridges for FireWire, and similar systems that use USB 2.0. I can purchase a 250GB Western Digital Caviar for less than \$100 (after rebate), and a simple aluminum heatsink enclosure with an IDE-USB bridge for less than \$50. That way, I can move the drive inside a desktop machine when I'm ready. Has anyone at *Maximum PC* ever modified an internal drive into an external solution with such an all-aluminum external enclosure, with or without a fan?

—JOHN SWEET

ASSOCIATE EDITOR JOSH NOREM

RESPONDS: We've had two external drives in the Lab peter out over the years (one from WD, one from Seagate). In both instances, we remedied the situation by simply opening up the enclosure and inserting a brand-new 3.5-inch internal drive. Once connected

to the USB/FireWire bridge, the external drive had a new lease on life. An internal drive resides in every external enclosure—you might think of it as a retirement home for midrange hard drives. Once a drive's smaller capacity or limited feature set causes it to tumble from the top tier, a manufacturer typically drops it into a plastic or aluminum housing and adds \$100 (or more) to its price. You can save a good chunk of cash by buying a bare 3.5-inch drive and wedging it into an external enclosure of your choosing. We've had good luck with Vantec enclosures over the years.

THE SPYWARE SCOURGE

Your February 2005 issue had information on how to perform a clean install of Windows XP and how to get rid of spyware. As a system builder and a technically savvy tweaker, I have found an additional tool that I think is a must-have on any clean OS install. It's called *SpywareBlaster*, from JavaCool Software, and it prevents spyware from ever being installed on your computer. I think it's a much more effective approach than any removal tool. I've been using this utility for more than a year and have not had any spyware enter my system.

—RICK L. BEWICK



BAIT AND SWITCHES

Been meaning to send you guys this picture of my local computer shop. It is actually open and does sell stuff. I'm not sure about the quality or volume of computer equipment they sell, though.

—MIKE HOWARD

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COMING NEXT MONTH

IN THE SMELLS-OF- ELDERBERRIES MAY ISSUE OF MAXIMUMPC

THE STATE OF THE MOTHERBOARD UNION

It's the most critical component of every power-user's rig, but blink and you'll find that the landscape of motherboard technology has suddenly changed. Don't panic! We'll show you the hot new chipsets, explain all the latest features, give you tips on picking the perfect mobo, and pit the biggest contenders against each other in a showdown that only the strongest will survive.

FOOLING WITH WATER COOLING

You don't have to start from scratch to trade up to a water-cooled rig. *Maximum PC* tests five water cooling kits that you install yourself for "eXtreme" overclocking goodness, or just a little peace and quiet.

BEHIND THE SCENES OF MMORPGs

Curious how a guy in New Jersey and a gal in Seoul can beat the porridge out of the same two-headed monster in a faraway land? *Maximum PC* takes you on an exclusive tour of the hardware and software that sustains the enormous worlds of massively multiplayer online role-playing games.

EDITOR IN CHIEF MICHAEL BROWN RESPONDS: Thanks for the tip, Rick. Here's yet another great utility: *WinPatrol*, from BillP Studios. This program produces an alert every time a program tries to create an entry in your Windows Registry or your startup configuration.

MOBO RISING

I have an itch to build my first gaming PC—something for my kids to play on, so I can have mine back. But my problem lies with deciding which mobo I should go with. I have an AMD Athlon 64 CPU, and I find that there are so many compatible motherboards to choose from. I'm new to system building, and I'm getting mixed reports about which one's best. I'll be using a separate videocard, so I shouldn't need graphics built in, right?

—DAN SCHEPPMAN

I was wondering, what's the best SLI motherboard when it comes to gaming. Money is no object.

—OMAR PUENTE

SENIOR EDITOR GORDON UNG RESPONDS: Your timing couldn't be better, guys. You'll find the answers to these and other hardware questions in our "Ultimate Upgrade Bible" story in this very issue.

CLEANLINESS IS NEXT TO...

Having trouble with your gaming PC? Open the case and start cleaning. Dust everything: all the fans, the power supply, the memory modules, your PCI and AGP cards, and so on. After a few hours with a can of compressed air and a toothbrush (please don't use your spouse's), I was able to bring my PC's temps down 20

CUT, COPY, PASTE

► Our "Massive Digital Media How-To" story (March 2005) listed the wrong URL for *AutoGK*. The correct url is www.autogk.net



There's no two ways about it: Some products just plain suck, as is the case with the Rave-MP MP3 player.

degrees. Keep your PC off the floor and it will help keep the dust bunnies from clogging your system.

—LANCE TIBBETS

WELL, IT'S ONE LOUDER, ISN'T IT?

I bought the Logitech Z-5500 system just before your review ran (November 2004), and it does kick ass. But I discovered something that I believe you have not reported. Up to now, I have never turned the infinite volume knob to full volume, but last night, I absent-mindedly kept spinning the knob (using headphones). Lo and behold, what appeared in the LCD display was "Boost 11." Do you think the "11" is an homage to *Spinal Tap*?

—KEN RUPPEL

THINGS THAT SUCK

I've been reading *Maximum PC* for about four years now, and have only one beef: You review some things that suck!

Why don't you just create a section called "Things That Suck," and instead of writing a long, drawn-out review, just give the products in that section a low rating and tell people not to buy them. I'm basing my comments on your review of the 5GB Rave-MP ARC5.0 MP3 player (February 2005). You gave it a 3 verdict and had nothing good to say about the product. Don't waste the space—just review things that don't suck.

—GARY MOSKALYK

EDITOR IN CHIEF MICHAEL BROWN RESPONDS: That would certainly make our jobs easier, Gary, but it wouldn't be fair to either our readers or to the vendors whose products we agree to review. If we're going to slam a product, we feel an obligation to explain how and why we found the product wanting. That helps readers avoid a bad product, and we hope it helps the vendor make a better product next time.

LETTERS POLICY: MAXIMUM PC invites your thoughts and comments. Send them to input@maximumpc.com. Please include your full name, town, and telephone number, and limit your letter to 300 words. Letters may be edited for space and clarity. Due to the vast amount of e-mail we receive, we cannot personally respond to each letter.



This is the Tip of America's Military Spear. You're on Point.

You are the First to Fight — a US Marine on the front lines of urban combat in Beirut. Lead a 4-man fire team that executes authentic Marine tactics. Move aggressively, knowing your team gives you 360-degree security, and devastate your enemies with precise air and mortar attacks. Experience a first-person shooter so realistic, the Marines use it as a training tool.



Play single-player, 4-man co-op, or go head-to-head in the Fire Team Arena.



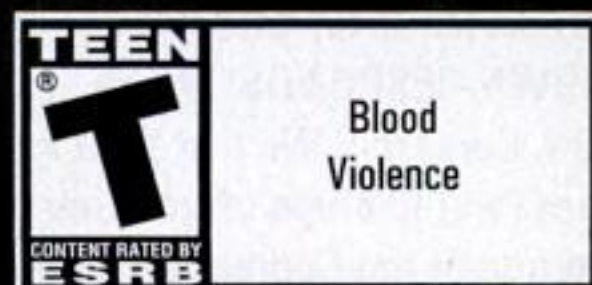
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In/Out



ATI Catalyst uninstaller

Removing video drivers completely from your system is right up there with flossing a cat's teet in terms of things that are easy to accomplish, which is why ATI released the Catalyst uninstaller. Simply run the program and it will remove all traces of any ATI display drivers from your system. To be used when switching brands or installing new video drivers.

Publisher: ATI

Online Information: <http://www.ati.com>

TEET FOR TAT

Just thought I would include a screenshot of an error I found in the March MaximumCD that came with my subscription. While being a small error (I think), it sure gave me lots of laughs. I believe the word is spelled "teat," and while I imagine that it's indeed hard to accomplish, I still don't understand why anyone would try to floss it.

—TYLER PETERSON

TECHNO JOURNALISTS ROCK!

I noticed that you referred to the people who dubbed the new Internet "Internet Mark II" as "dull technology journalists" ("Internet 2: Son of Internet," March 2005). As a huge fan of the movie *This is Spinal Tap*, I took a different perspective. In the movie, when Nigel leaves the band and they decide to go on without him, David introduces the band as "Spinal Tap Mark 2" at the very next show. I have no idea if this is what those journalists intended, but to a *Tap* fan, it's brilliant!

—ERIC CHRISTENSEN

THE PASSION OF THE COLUMNIST

Why in the world would Mr. McDonald say *The Passion of the Christ* absolutely demands a uniquely Catholic mindset to fully understand it ("Game Theory: Bloody Hell," March 2005)? Is he unaware that Christians all over the world owe their salvation to the fact that Christ willingly submitted to death on the cross? He came to earth for that purpose and not only do we Christians fully understand it, we are

"eternally" grateful to him for it. Mr. McDonald takes a very narrow view.

—MARV OWN

I don't know if Mr. McDonald is simply being provocative in order to get lots of e-mail (which I'm sure he'll get), or if he is describing his actual personality. While I agree with several points: Christianity and violence are closely tied (the Crusades, the Inquisition, the Salem witch trials, and so on); blood sacrifice was the foundation of many religions; and especially that people who have any kind of a fascination with violence are doing the right thing by using what he calls "harmless imaginary diversions" to satisfy these desires. This is the way a normal person handles it. Anyone who is so mentally ill that they're on the verge of murdering someone certainly doesn't need a video game, movie, TV show, book, or song to tell them how to do it.

The only thing I *don't* agree with is his assertion that *enjoying* ultra-violent entertainment is actually

"healthy." I personally don't enjoy the bloodbaths in PC games or movies—they don't disgust me or make me sick or anything like that—I just don't get any entertainment value out of them. So which one of us is "healthier"? Although playing violent games is a harmless and healthy way to appease one's violent tendencies, I don't agree that having them in the first place is a healthy thing. I'd like to think there are many more nonviolent people out there besides me.

—DAVID A. NICHOLAS

PAINT YOUR WAGON

In your "Paint Your Case Like a Pro" article (March 2005), you emphasized so much about using safety equipment, but on the first page of the article, Paul is not wearing safety glasses. Shouldn't he be wearing safety glasses to protect his eyes?

—CAMERON FISHER

EDITOR IN CHIEF MICHAEL BROWN RESPONDS: You're right, Cameron. We just didn't want Paul to come off looking like one of the Combine soldiers from *Half-Life 2*. ■

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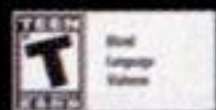
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QuickStart

The beginning of the magazine, where articles are small

The Pentium 4 Gets a Makeover

With dual-core CPUs waiting in the wings, Intel breathes new life into the Prescott core

Just when we thought Intel was preparing to retire the Pentium 4 in order to make way for its eagerly anticipated dual-core CPUs, along comes word that not only is the company not going to retire the long-running chip, but it's launching two new drastically improved versions of the vaunted Prescott core.

Pentium 4 660

Intel's new "mainstream" processor is actually a tick slower than its predecessor, ringing in at 3.6GHz, compared with the 3.8GHz of the 550 J it replaces. Although its clock speed is lower, on-die L2 cache has been doubled from an already generous 1MB to 2MB, which should lend a considerable performance boost to desktop apps. As with previous Prescott cores, the 660 CPU is built on a 90-nanometer process and uses an 800MHz front-side bus. This chip will be the flagship of the 6xx CPU series.

Pentium 4 Extreme Edition

The 3.4GHz Extreme Edition will be replaced by a heavily revamped model that runs at 3.73GHz and has 2MB of L2 cache. This is a major change from the previous chip, which sported 2MB of L3 and only 512K of L2. This CPU benefits from a die shrink—from 130 to 90 nanometers—and it supports a 1066MHz front-side bus.

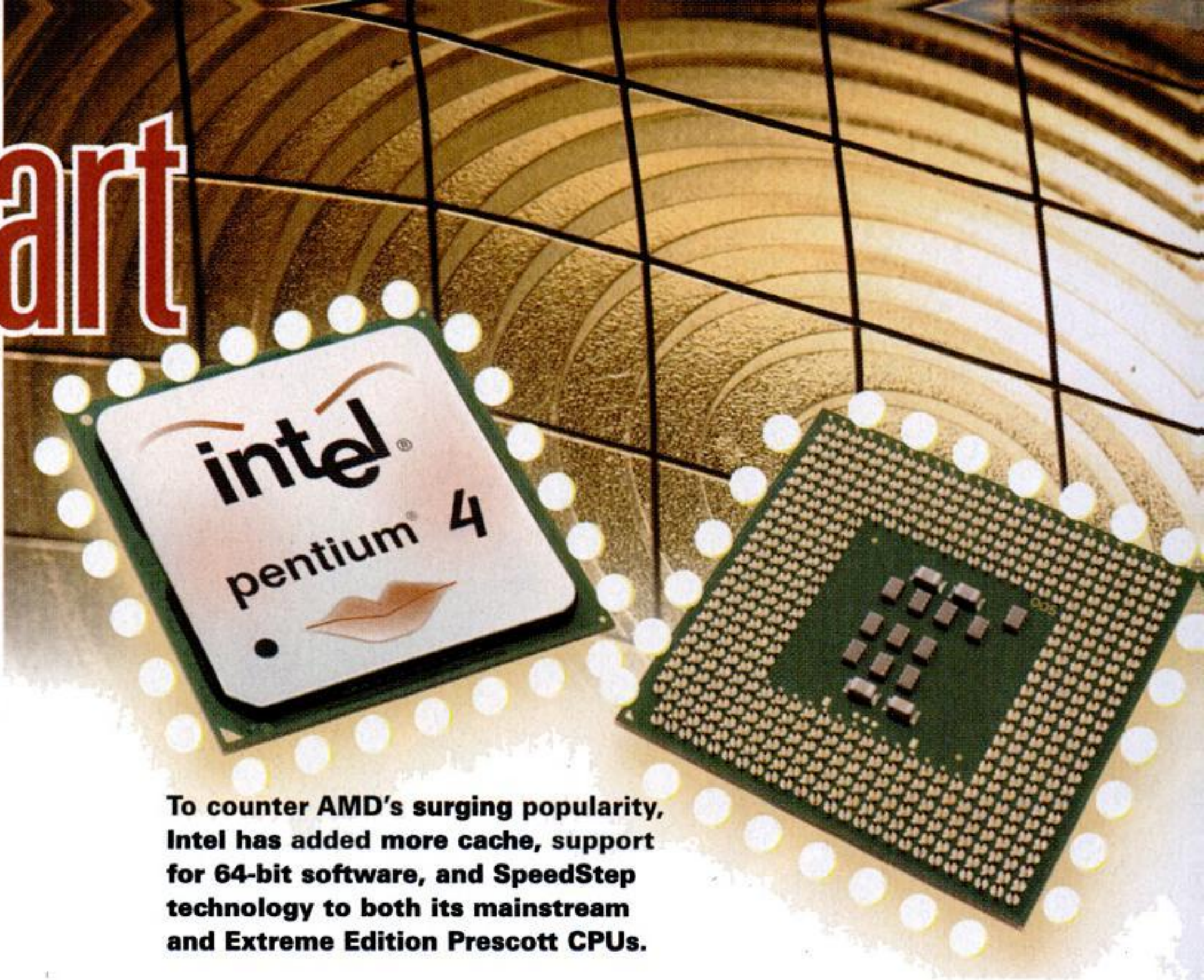
64-bit and SpeedStep

What's most interesting about these new CPUs, however, is that they both include two important new features: Support for EM64T (Extended Memory 64 Technology) extensions and an implementation of Intel's Enhanced SpeedStep technology. EM64T extensions will enable the processor to take advantage of 64-bit software applications, including Microsoft's upcoming Windows XP Professional x64. AMD has offered 64-bit desktop CPUs for more than a year

now, but Intel has claimed it was holding off on implementing the technology until Microsoft was ready to ship its new OS.

Enhanced SpeedStep power-management technology, which is already featured in Intel's Pentium M chip for notebook PCs, uses voltage and frequency stepping to vary a processor's speed, power consumption, and related cooling requirements. Whenever the CPU is idle or running an application that doesn't require its full processing power, the chip can run at a slower speed to conserve electricity and reduce its heat output.

Intel also announced the completion of initial production runs of its new dual-core CPUs (see sidebar), but clearly it has no intention of abandoning single-core development. The addition of such important features to its single-core product line is a sure sign that Intel intends to keep this chip around for a while.

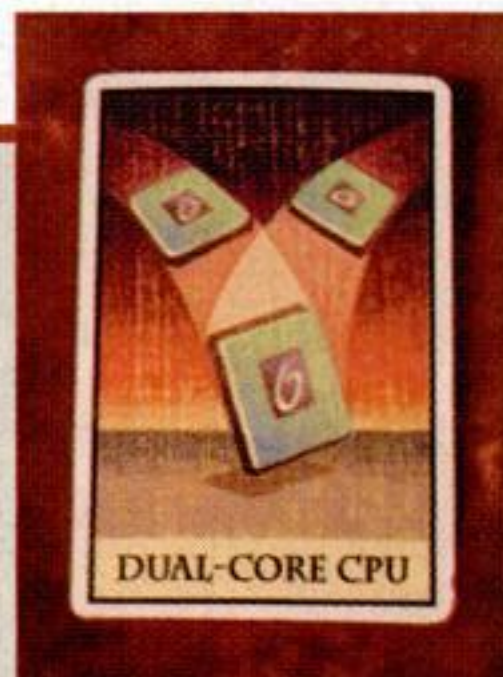


To counter AMD's surging popularity, Intel has added more cache, support for 64-bit software, and SpeedStep technology to both its mainstream and Extreme Edition Prescott CPUs.

Intel Steals AMD's Thunder with Early Dual-Core Release

Intel has finally come forward with some hard info about its dual-core CPU plans, announcing its intention to ship two dual-core processors and three new chipsets in the second quarter of 2005. Just last month, AMD announced plans to introduce its own dual-core CPU, code-named Toledo, in the second half of 2005.

There's little public knowledge about AMD's double-wide silicon, but Intel is being fairly upfront about its plans. The company will offer a mainstream dual-core Pentium-class processor (previously code-named Smithfield), as well as an Extreme Edition that will



support Hyper-Threading. The mainstream processor will be supported by two different chipsets: the Intel 945G and the Intel 945P, both of which were previously code-named Lakeport.

The Extreme Edition will be supported by the Intel 955X Express chipset, previously code-named Glenwood, which includes features such as Intel

High Definition Audio, PCI Express, and faster dual-channel DDR2 memory. Intel claims that the Extreme Edition's support for Hyper-Threading, which enables a proc to execute threads in parallel when running multi-threaded software, means the dual-core chip will be able to process *four* software threads simultaneously.

nVidia Opts out of Incremental Upgrade Cycle

SLI becomes the 6800's six-month refresh



It used to be that you could count on graphics-chip manufacturers to release a new core every 18 months, and then follow that up with a mild clock and/or memory bump six months later. But it's been more than six months since nVidia released the NV40, and our hotline to nVidia headquarters hasn't rung once.

As it turns out, the hotline won't be ringing any time soon: nVidia has decided to skip the cycle in favor of pushing PCI Express SLI configurations as the upgrade path for graphics cards built around the NV40.

Not offering a six-month refresh is a major diversion from the course nVidia has charted for several years now. ATI, for its part, obviously still believes in the strategy—the company just released its X850 XT Platinum Edition, which is less than 10-percent faster than the PCI Express version of the X800 XT Platinum Edition (which never made it to the retail channel in quantity).

We actually welcome this cooling of the videocard wars. Teeny speed bumps don't really benefit anyone, and the only reason the products boasting them are even released is so one company can inch ahead of the competition. The X850 XT Platinum Edition is the perfect example: It's not much faster than the X800 XT Platinum Edition, but it is just a smidgen faster than nVidia's 6800 Ultra. And that move allowed ATI to claim the performance crown.

SLI is actually a pretty good upgrade route, especially if you already own a card that's SLI-capable. Adding a second graphics card is guaranteed to deliver a bigger speed boost than replacing one graphics card with another that's only slightly faster, as long as the games you play can take advantage of SLI, of course.

The good news for ATI is that it currently owns a slightly bigger chunk of the market for discrete desktop graphics chips: 51 percent to nVidia's 46 percent. If ATI intends to hold on to that edge, however, the company will need to come up with an SLI solution of its own—unless it manages to pull off some other trick to deliver SLI-caliber performance.

With lightning-fast cards like the 6800 GT (above) and 6800 Ultra available, we're not peeved at nVidia for sitting out this upgrade cycle.

Open Source...Hardware?

Open-source gurus love to tweak, modify, and improve their operating systems and applications to no end. But when it comes to videocards, they're stuck with a tough choice: Either use the proprietary closed-source binary drivers the manufacturer offers, or run the 2D-only open-source drivers.

The Open Graphics Project (OGP) hopes to change this trend by releasing a graphics chipset with freely available hardware specs for all aspects of the card—a first for the industry. The OGP has been working on its home-brewed open-source videocard with close cooperation and plenty of feedback from the community, and the project is close to completion. The card is tentatively scheduled to offer resolutions up to 2048x2048, dual-link DVI, analog VGA, and TV-out. Unfortunately, the card won't have the 3D chops of commercial gaming cards—it's reliant on the host CPU for geometry and vertex processing. Because of this limitation, the card is being designed not for gaming performance, but rather for stability. Don't expect to play *Doom 3* on this puppy!

The PCI version of the card is set for a June 2005 release, with AGP and PCI Express versions to follow.



Linux lovers (above) will soon be able to run open-source videocard drivers, complete with 3D support.

The Myths of Moore's Law



April marks the 40th anniversary of Moore's law. Nobody in 1965 would have dreamed it would become so popular that even people who know nothing about semiconductor manufacturing would be quoting it in 2005. A quick Google search found more than 248,000 hits for the phrase. Unfortunately, most of those 248,000 references are wrong. Moore's law is one of the most widely misunderstood laws in history. Let's set the record straight.

Myth: Moore's law is a law. **Fact:** It's an observation, not a true scientific law. It doesn't actually govern the progress of semiconductors; it merely attempts to describe the pace of their progress.

Myth: Moore's law was created by Intel cofounder Dr. Gordon E. Moore. **Fact:** Although Moore did make his famous observation in the April 19, 1965 issue of *Electronics* magazine, he didn't call it Moore's law—indeed, the word "law" appears nowhere in his article—and he didn't explicitly state the law in a form easily recognizable today. Years went by before other people coined the term "Moore's law" and boiled it down to a succinct statement.

Myth: Moore's law says microprocessors get twice as fast every 18 months. **Fact:** Moore's law describes component integration on integrated circuits that are economical to manufacture. It doesn't describe clock frequency or other aspects of processor performance. Actually, Moore's article doesn't mention microprocessors at all, because they weren't invented until six years after his article appeared. And he wasn't talking about the maximum number of transistors that could fit on a chip, either. He was describing component integration on economical integrated circuits, not the most expensive chips manufacturable at any given time.

Myth: Moore's law predicts a new semiconductor generation every 18 months. **Fact:** Moore observed that component integration doubled approximately every 12 months. In 1975, he lengthened the period to 24 months. Since then, other people—not Moore—have split the difference to 18 months.

Myth: Moore's law is uncannily accurate. **Fact:** Moore's law is way off. If the original 12-month period had held true since 1965, today's chips would have more than 27 trillion transistors. The 24-month revision predicts 37 million. Actual progress: Intel's Prescott Pentium 4, a relatively economical chip, has 169 million transistors.

Myth: I'm attacking Moore's law and the eminent Dr. Moore. **Fact:** I admire Moore and his law. It has been a valuable way of describing the general progress of integrated circuits, even if it isn't infallible.

Tom Halfhill was formerly a senior editor for Byte magazine and is now an analyst for Microprocessor Report.

FUN-SIZE NEWS

HP'S MAJOR BREAKTHROUGH

Researchers at Hewlett-Packard have designed a "crossbar latch" to replace the modern-day transistor, potentially paving the way for inexpensive computers that are thousands of times more powerful than today's. No way, right? We know. The crossbar latch itself is a nanometer-size wire that is crossed with two other wires to function as an electric switch. It's crazy! But don't start fantasizing about holodecks just yet; the technology is still deep in R&D and likely won't emerge for years. Think of it as a technology bear that is still hibernating.

HP'S MAJOR BOO-BOO

If you thought DVD region-coding was annoying, you ain't seen nothin' yet. Hewlett-Packard recently began region-coding its printers and inkjet cartridges in Europe, and the company plans to spread the practice internationally. Why? With the value of the Euro soaring and the value of the dollar sinking, European buyers can save money buying cartridges in the U.S. and having them shipped overseas. Thanks to region-coding, however, U.S. cartridges won't operate in European printers. HP defends the practice by claiming its only trying to protect consumers from price inflation.



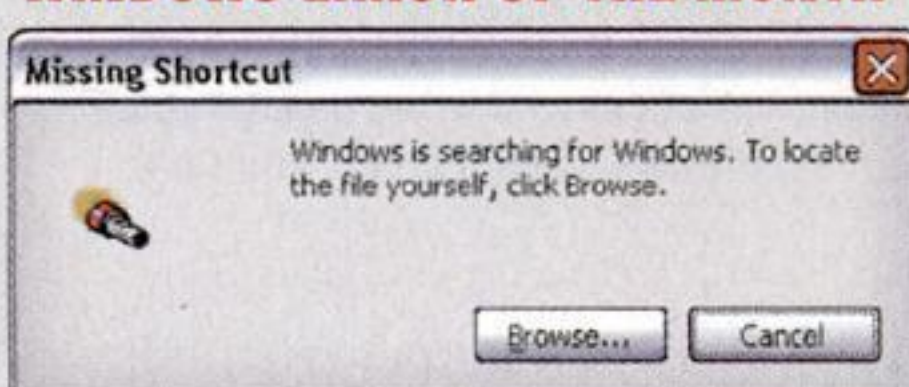
INTERNET EXPLORER 7 TO HATCH EARLY

The browser war is about to get hot again with the news that Microsoft will ship a beta version of *Internet Explorer 7* this summer, rather than bundle it with its next-gen OS (code-named Longhorn).

This news is either a blessing or a curse for consumers because *IE7* will only run on versions of Windows XP that have been patched with Service Pack 2. This requirement will leave roughly half of the Windows-running world out of the loop.

Microsoft cites security concerns as the primary motivating factor in advancing *IE7*'s release date, but we think there are two other plausible reasons. The first is *Firefox*, which has helped push Microsoft's browser market share below 90 percent for the first time since *Netscape* died. The other reason is that Longhorn is facing further delays and could slip from its 2006 release date.

WINDOWS ERROR OF THE MONTH



Microsoft to Pirates: "No Patches for You!"

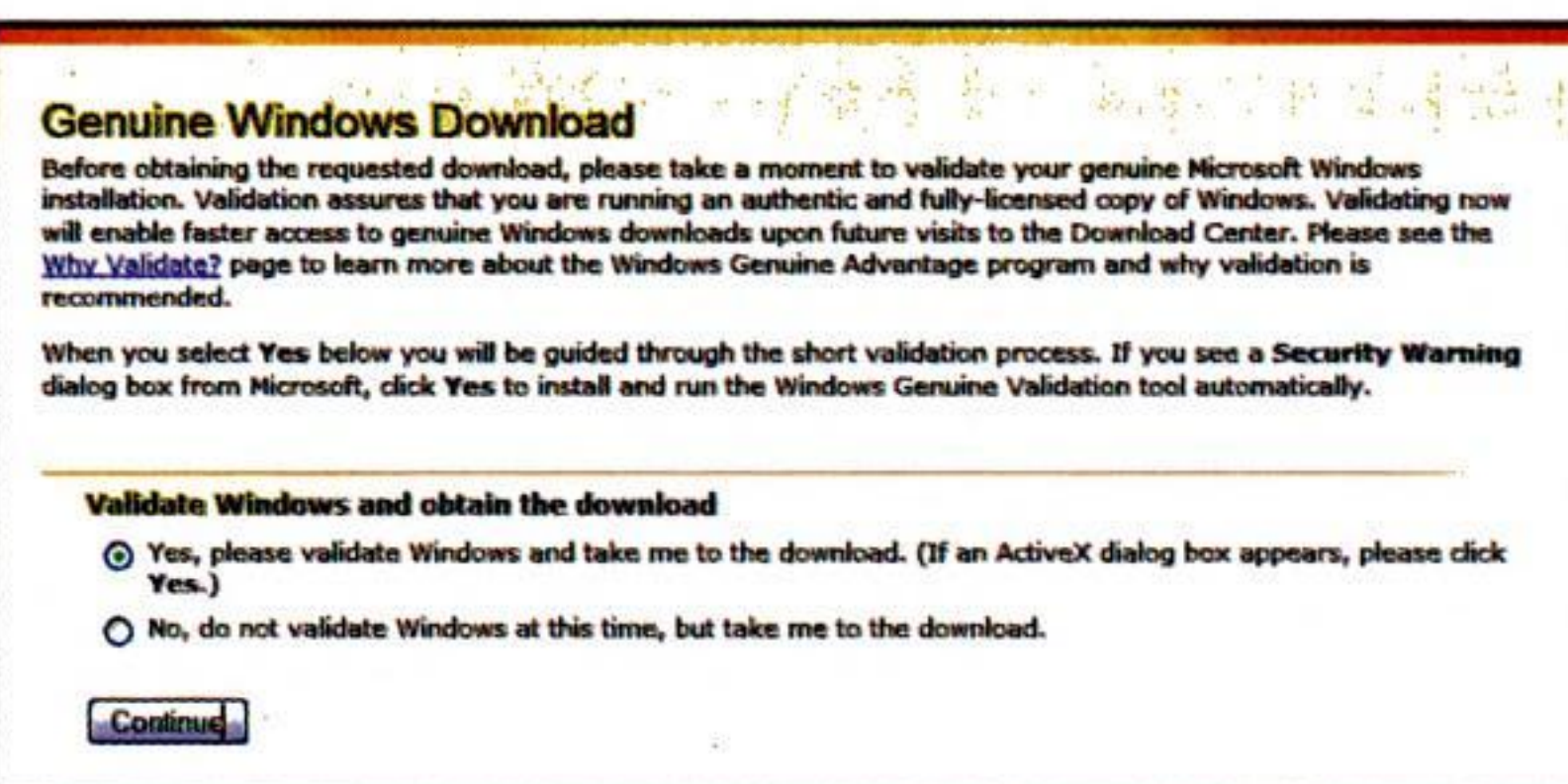
Authentication will soon be required to download OS fixes

Attention software pirates: You better start running spyware and virus scans religiously, because by the middle of 2005, you'll no longer be able to download security fixes for your Microsoft OS unless you authenticate it first.

Microsoft's move to require authentication prior to downloading much-needed security patches and hotfixes is a bold anti-piracy maneuver that's sure to make even legitimate OS owners grouse. But Microsoft claims it has no choice. While roughly a quarter of the total software in the U.S. is pirated, the piracy rate is as high as 92 percent in some of the world's poorer countries.

License verification will be processed through the Windows Genuine Advantage program, which Microsoft has been test-marketing since September 2004. Unlicensed users will be barred from downloading any and all Microsoft software, including security updates and patches, but they reportedly will not face any other sanctions. Users without a valid software license will instead be offered an opportunity to purchase a discounted version of Windows.

Microsoft describes the move as an effort to "add value" to the purchase of a Windows operating system. PC enthusiasts who see troublesome parallels to Valve Software's Internet-authentication requirement for *Half-Life 2* might want to look at the bright side: At least you'll never get the message, "Service unavailable, please try using your OS at a later time."



You can opt out of Microsoft's Genuine Windows Download program for now, but it will soon become a prerequisite to obtaining new security patches.

PDAs Officially Jump the Shark

Once-cool devices enter third year of decline

A new IDC report states what most of us have known to be true for some time now—the PDA market is on life-support. Total annual sales of 9.2 million devices in 2004 might sound impressive, but the fact is that 2004 was the first year since 1999 that fewer than 10 million of the handheld devices sold. What's more, 2004 marked the third consecutive year of decline for the handheld since the market peaked in 2001. Ouch.



Our love affair with the PDA is nearly over, thanks to smartphones such as the Treo.

The death of the PDA has been hastened by two factors: The ever-increasing reliance on cellphones as the preferred device to carry in one's pocket, and the addition of PDA-like qualities to cellphones, transforming them into so-called smartphones. "Consumers don't see the need to invest \$600 in a handheld device," says IDC analyst David Linsalata, "if a smartphone can do the same basic tasks."

The grim forecast for PDAs stands in stark contrast to the rising success of the converged mobile-device market, which posted sales numbers that surpassed handheld devices for the first time in 2004. In mid-2004, as you might recall, both Sony and Toshiba abandoned the U.S. handheld market to focus on smartphones. Companies that remain committed to handhelds, including segment-creator Palm, are faced with the difficult task of proving the devices are still relevant.

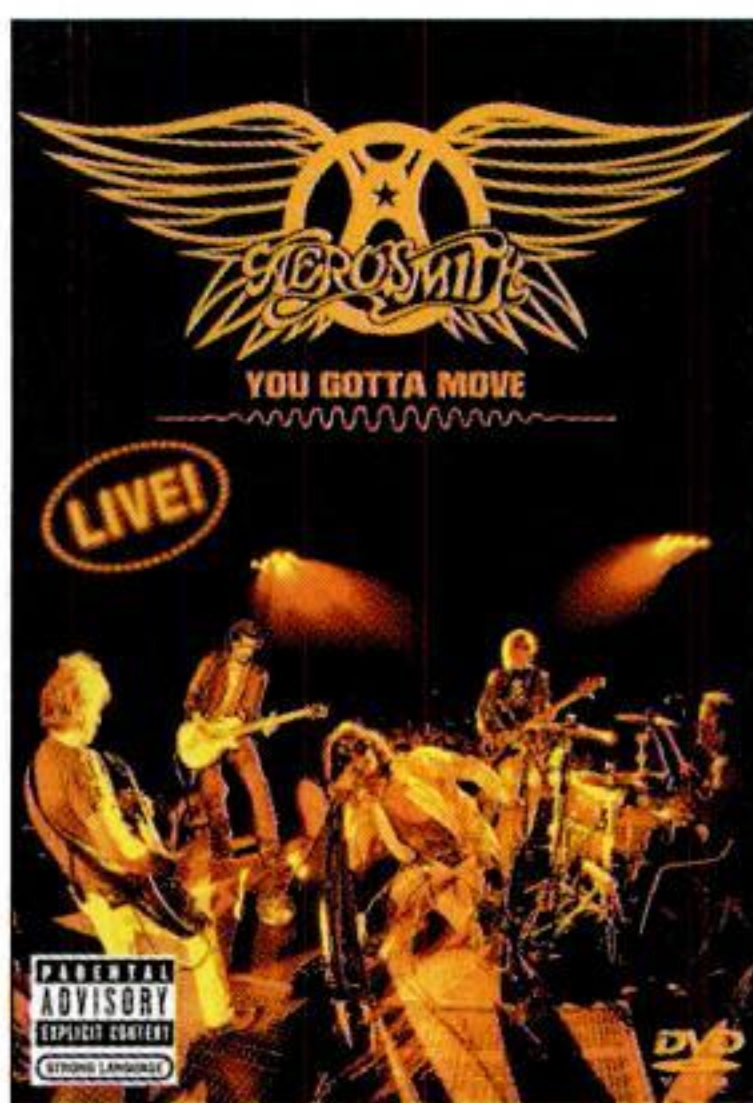
New Relevance for Audio CDs?

Or is this technology just goofy?

Music-downloading services such as iTunes are making compact discs look a little dowdy these days, but a new technology that lets listeners create their own mixes from prerecorded music might spark renewed interest in the format.

New York-based Umixit (www.umixitmusic.com) has cuddled up with Cakewalk (the developer of *Sonar* and *Project 5*) to create a program that allows CD and DVD buyers to create their own custom mixes of selected songs. In addition to the regular studio-mix tracks, a Umixit disc will contain an eight-track version of one or more songs, a 16-track upgrade option, a collection of royalty-free *Acid*-format loops, and Cakewalk's *Media Mixer* software. Load the tracks into *Media Mixer* on your PC, and you can isolate the vocals, guitar, bass, drums, or other instruments; apply different audio effects or EQ settings to the tracks; and even insert loops. You can save your creations to your hard disk, burn them to CD, or download them to an MP3 player.

So far, only one big-name artist—Aerosmith—has signed up to use the technology (you'll find it on their *Time Will Tell* live DVD). You'd think that the record labels would be falling all over themselves to take advantage of this opportunity to give CDs renewed relevance, but time will tell.



Just think: Aerosmith with more cowbell!

The MPAA Fights Back Against P2P

New software helps parents delete kids' music, videos, apps

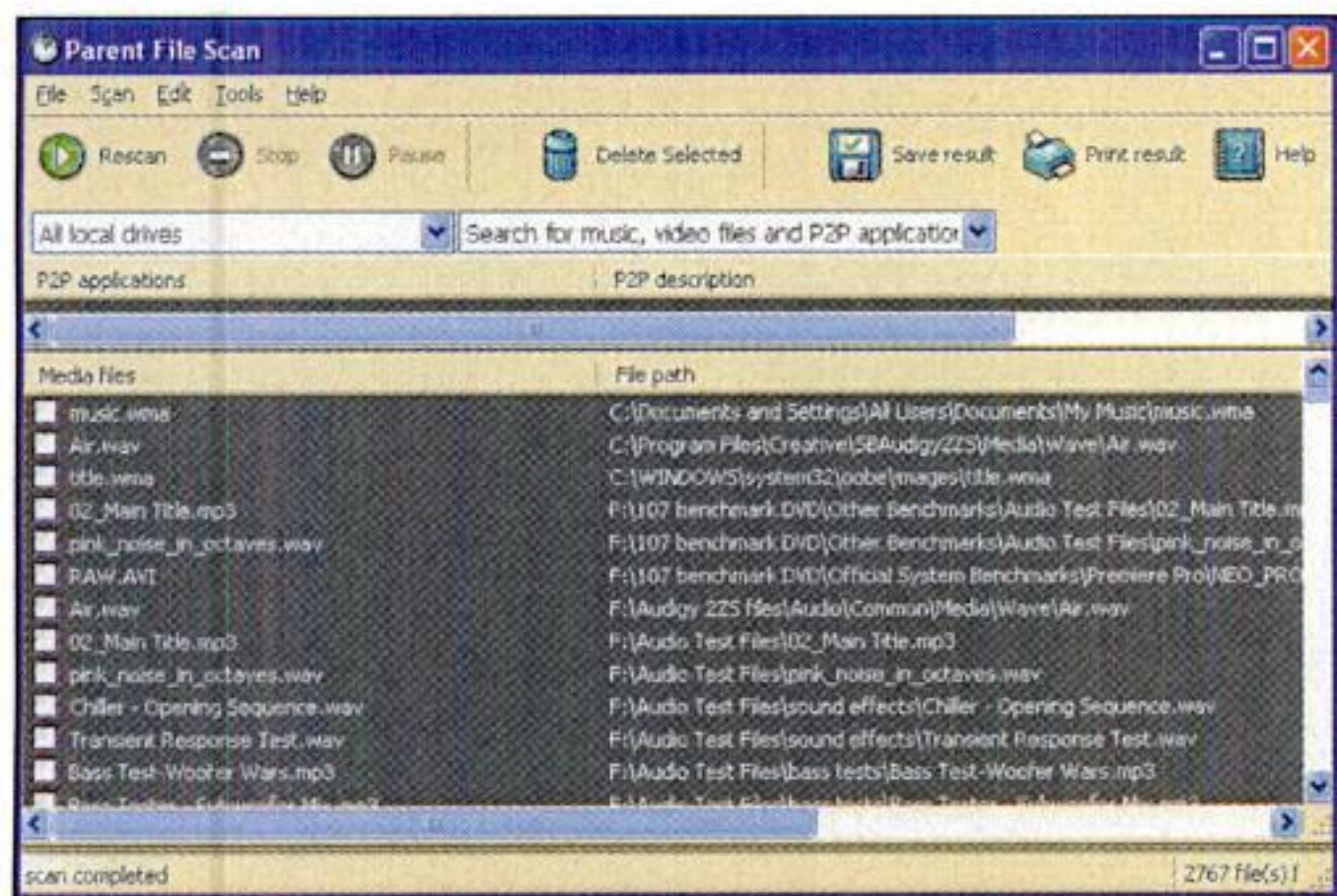
In what will surely be a fatal blow to the millions of P2P software users worldwide—or at least the extremely gullible ones—the Motion Picture

Association of America (MPAA) has unveiled a new software utility that detects the presence of P2P file-sharing apps and the files associated with them on a PC.

The software, dubbed *Parent File Scan*, detects every music, video, and animation file on your PC—as well as the presence of P2P file-sharing applications, such as *Kazaa* and *BitTorrent*—and offers you the opportunity to wipe out everything in one fell swoop.

What *Parent File Scan* cannot do, however, is identify whether the WAV, MP3, AVI, MPEG, and other media files it detects have been illicitly copied, legally purchased, legally ripped, backed-up from purchased media, or—in the case of home movies and original songs—personally created by the user. As a disclaimer on the MPAA website (www.respectcopyrights.org) states, *Parent File Scan* “does

not distinguish between legally and illegally obtained content. It is up to the user to make that determination.”



Parent File Scan finds every piece of media on a PC, leaving it up to the user to decide what's hot and what's not. “Hot” as in stolen, that is.

GAME THEORY BY THOMAS L. McDONALD

Adrift in Dangerous Waters



Watching a “system simulation” game over someone's shoulder is akin to watching an old lady knit; except it's far less action-packed.

System sims occupy a unique niche of military gaming that focuses on the individual stations, sensors, weapons, and technology that drive modern warfare. While such things are the digital equivalent of black-tar heroin to military fetishists like me, they leave giant swaths of the gaming population utterly cold, largely explaining the genre's obscurity.

Dangerous Waters, a new naval-combat simulation from Sonalysts Combat Solutions, reminds me just how far I've drifted from my roots as a PC gamer. Early on, some of my happiest gaming moments involved practicing pop-up attacks in *Gunship* and mastering advanced radar modes in *F-15 Strike Eagle III*. Modern gamers (and I'm including myself here) no longer have the patience for 500-page manuals and an hour's worth of gaming for a few seconds of payoff, but I remember that payoff being all the sweeter for having been hard earned.

A single mission in *Dangerous Waters* can easily last a couple hours, with approximately two minutes of that time involving something most reasonable people would call “excitement.” The rest of the time involves thinking like a modern force commander: evaluating contacts, making decisions about when and how much to use your various sensor packages, choosing weapons, and so forth.

But for devotees of military tactics and gear, the very process of thinking like a commander is a powerful lure. I can't imagine it appealing to someone without a passion for modern fleet combat. Unlike *Rome: Total War*, for example, which can readily appeal to strategy gamers regardless of their knowledge of ancient Rome, *Dangerous Waters* is too specific, too demanding for a wide audience.

Coming back to a game like this, at this point in my life, has been an illuminating experience. It's been a long time since I've dug into a hardcore game and really spent time with it. Ten years ago I would have spent hours and hours dissecting the game's missions. I would have waded in hip deep and loved every moment of it.

That was before kids, and a house, and all the responsibilities of parenthood and early middle-age. *Dangerous Water* reminds me how much my gaming muscles have atrophied after years of RTS and action titles. Yep, that 500-page manual sure looks a lot thicker than it used to.

Tom McDonald has been covering games for countless magazines and newspapers for 11 years.

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DISPLAY

17" UltraSharp™ Wide Screen XGA+ Display

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Head2Head

A showdown among natural PC competitors

THIS MONTH: Smartphones

When Sprint added two new “smartphones” to its repertoire, we saw an ideal opportunity to compare and contrast the advantages of the phone-that’s-also-a-PDA with the PDA-that’s-also-a-phone.

Considering the torrid love affair we’ve had with the Treo 600, we could have been charged with a predisposed bias; the results from this month’s Head2Head, however, were anything but predictable.

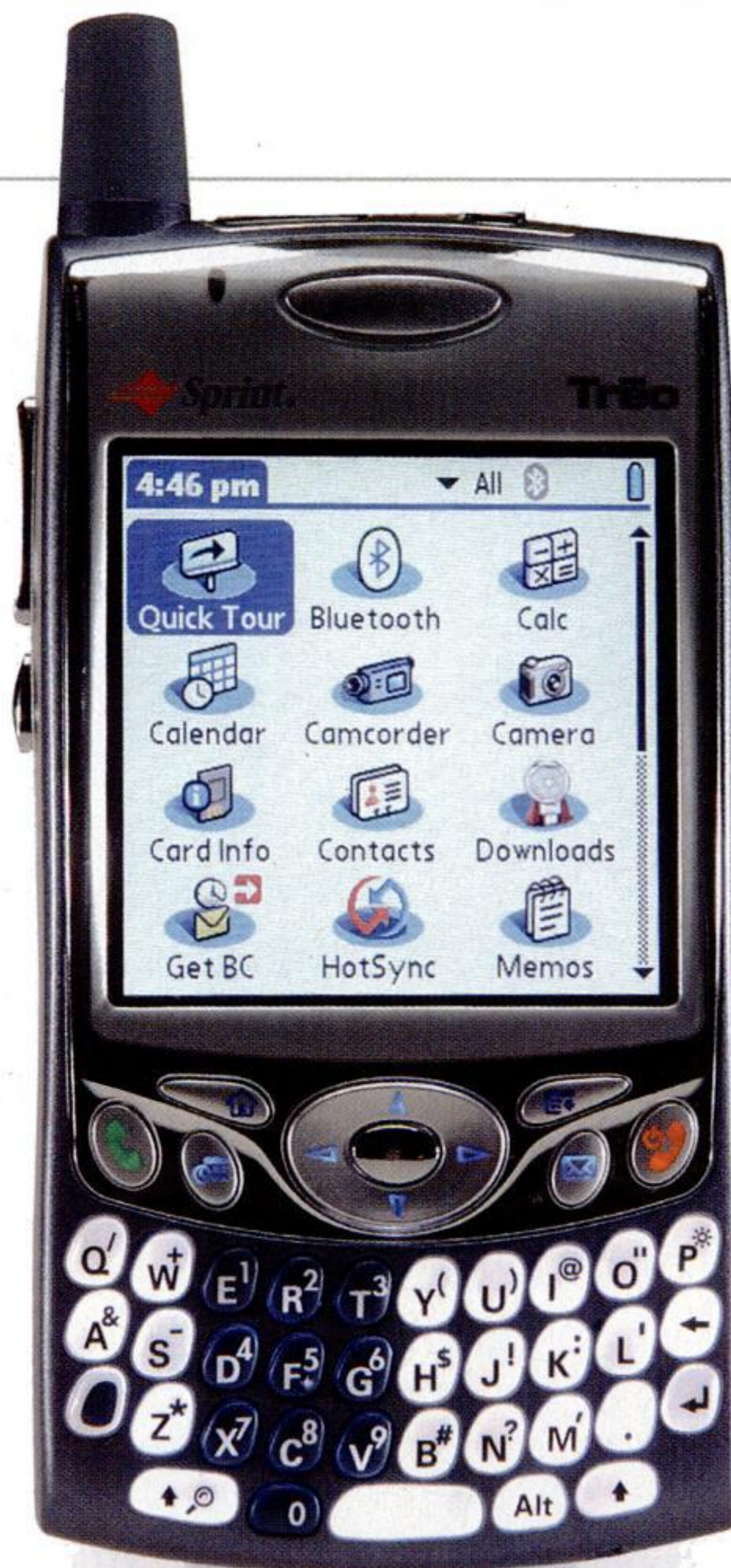
—LOGAN DECKER

TREO 650

The guts: The Treo 650 uses Intel’s XScale PXA270 312MHz proc, and it has 32MB of RAM, plus 23MB of nonvolatile flash RAM for storage. Speed really isn’t a phone’s primary attraction, so the processor can’t be considered its most important component. The Treo’s applications respond with snap, anyway, so no problem there. But still, it can’t handle the gee-whiz games you’ll find on the Pocket PC. **Winner: Audiovox PPC-6601**

Features: The Treo includes a 0.3-megapixel camera that can also record low-rent video. The keyboard is a huge asset, and the display has been upgraded to a handsome 320x320. There’s an SD card expansion slot at the top of the device. Its hallmark features, however, are its size and weight. It’s big for a cellphone, but the 6.3-ounce Treo 650 is hardly cumbersome. **Winner: Tie**

Ease of use: Despite its smaller size, the raised, rounded buttons of the Treo 650’s keyboard render it vastly superior to the flat design of the PPC-6601’s keyboard. The Palm OS 5 (code-named Garnet) retains the ease-of-use edge over Windows Mobile Second Edition, although the Palm Desktop is way overdue for a facelift. **Winner: Treo 650**



Battery life: Chatty *Maximum PC* editors got two-and-a-half days worth of heavy use, including phone calls, e-mails, web surfing, and the occasional MP3 break. Both the Treo 650 and the Audiovox PPC-6601 have removable batteries, but the Treo 650 takes home the endurance trophy. **Winner: Treo 650**

Connectivity: We used to love the convenience of surfing the web via the Treo’s keyboard and stylus, but after using the PPC-6601’s much faster network... well, it’s no contest. The Treo 650 does not support dial-up networking for your laptop via Bluetooth. This is unforgivable, and although Sprint says it will remedy the shortcoming with a firmware update, no such update was available at press time. Besides, the Treo 650 should have been able to do this from the get-go. **Winner: Audiovox PPC-6601**

MAXIMUM PC VERDICT 8

+ NOOKIE

Strikes a near-perfect balance between a PDA and cellphone.

- NOOGIE

Can’t be used as a wireless modem for your laptop.

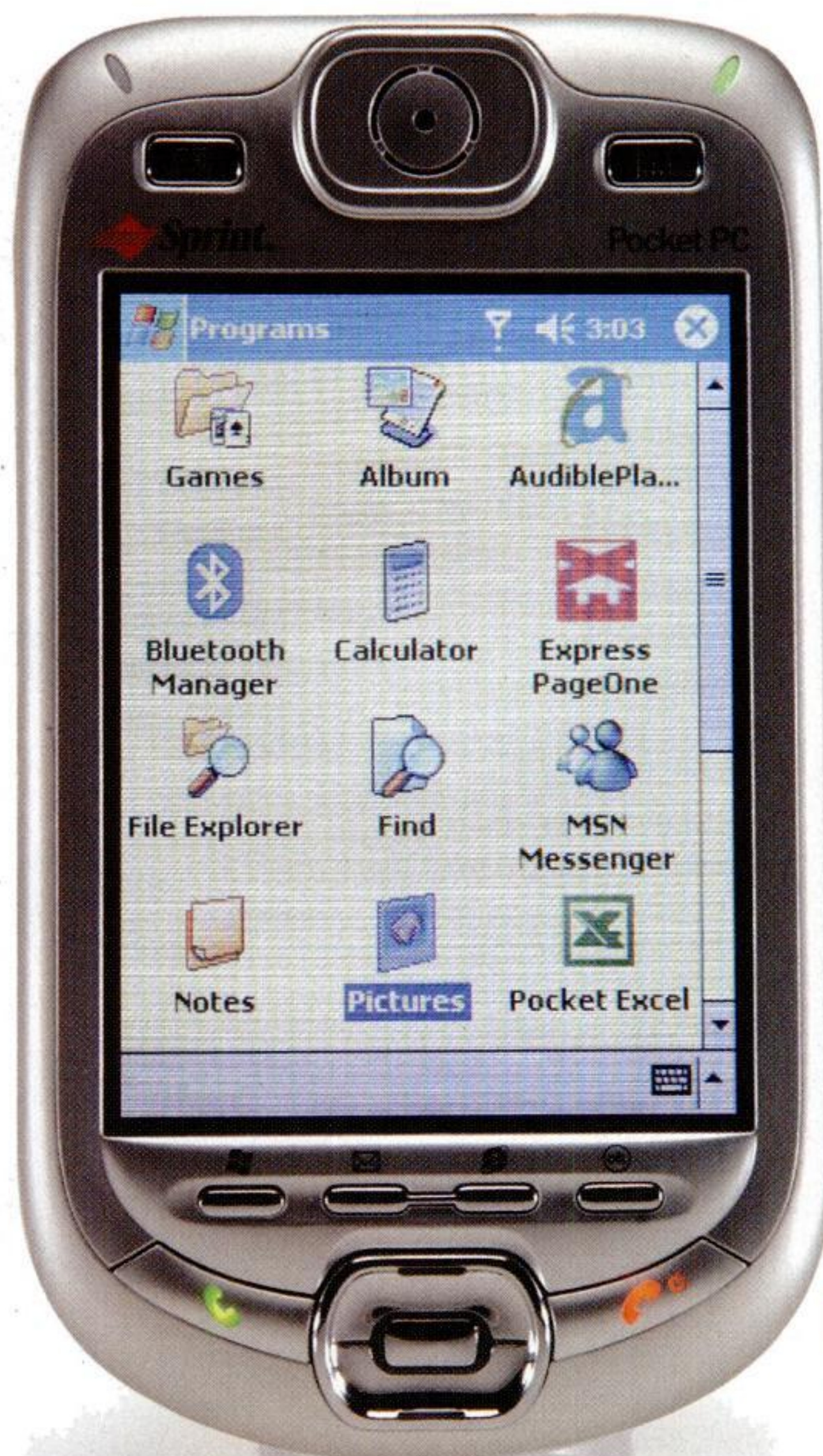
\$600, www.sprint.com

AUDIOVOX PPC-6601

The guts: No contest here. The PPC-6601 packs an Intel XScale PXA 263 400MHz proc. It's not the fastest Pocket PC noggin on the market, but it beats the pants off the Treo 650 when it comes to running games and applications. There's a generous 128MB of RAM, but nonvolatile storage (that won't develop amnesia if your battery runs out) is only available through the SD card expansion slot (no card included). **Winner: Audiovox PPC-6601**

Features: Naturally, you get all the benefits of a full-size Pocket PC, including a generous 3.7-inch screen (unfortunately, the resolution is a modest 320x240). There's also a surprisingly usable speakerphone and plenty of buttons for games. And overall, it's not too large as PDAs go. **Winner: Tie**

Ease of use: The slide-out keyboard looks cool, if that's the effect you're after, but the U-shaped design is a disaster. Messaging takes a great deal of effort on the nearly flat keyboard surface, and our eyes had to constantly alternate between locating the correct keys and checking the screen to make sure we actually hit them. **Winner: Treo 650**



Battery life: We got a little more than a day's worth of heavy use, including frivolous web surfing, e-mailing, and endless chit-chat over the phone. The short lifespan is understandable, considering its screen size, but the PPC-6601 still loses to the Treo 650 on this point. **Winner: Treo 650**

Connectivity: We're appalled by the absence of Wi-Fi, but the PPC-6601 can at least be used as a Bluetooth wireless modem for your Bluetooth-enabled laptop. Web surfing is exponentially faster than on the Treo 650, and we love the Pocket PC's one-column view for web pages. **Winner: Audiovox PPC-6601**

MAXIMUM PC VERDICT 9

+ OSMOSIS

Surprisingly good-sounding phone with a brawny proc, and a slide-out keyboard.

- HALITOSIS

Keyboard is awkward to use; device is somewhat bulky.

\$600, www.sprint.com

THE UPSHOT

We still have strong feelings for the new-and-improved Treo 650, and there are a few of us who still prefer its compact size and idiot-proof design. But the Treo's lack of support for dial-up networking leaves us cold. The PPC-6601 is a high-quality phone that's also a full-featured PDA, and we'll

never have to worry about Internet access on the road. Yes, it's the size and shape of a soap dish, but after using both devices for months, we can't deny that we prefer the PPC-6601's versatility. ■

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WatchDog



Say hello to **Maximus**,
WatchDog of the Month

Maximum PC takes a bite out of bad gear

THIS MONTH: The WatchDog goes after...

> Hard drive warranties > Roxio > Hewlett-Packard

One-Year Warranty Lasts Just Six Months

DEAR DOG: I recently had a 160GB Seagate drive die on me. Seagate's tech-support people verified that the drive was indeed dead and assigned me an incident number. I was told to call warranty support to do the RMA. It turns out that even though I bought the Seagate-packaged drive brand-new and had only used it for four months, it was out of warranty. I asked Seagate how this could be. I was aware that Seagate only covers this drive with a one-year warranty, but I was not aware that the start of the warranty is the day the drive ships from the factory, and not the day I bought it.

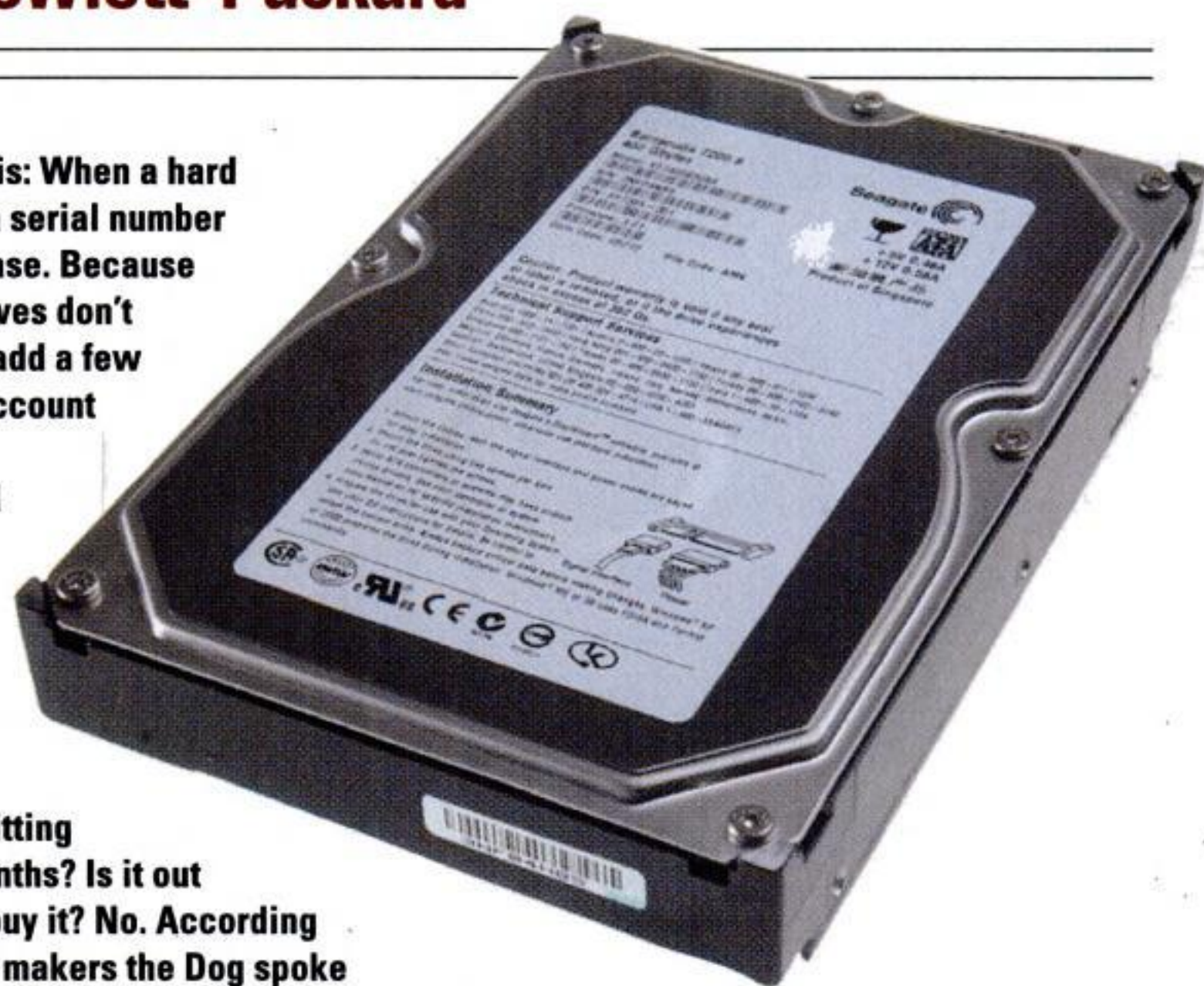
Is this standard industry practice, or just specific to Seagate? It seems very slimy to me, as I think most people consider the warranty to start from (at least) the day they buy the device. It would seem this is just another crappy way companies try to cut costs in areas where most people won't think to look.

My case has a happy ending, though, as I managed to convince a warranty support manager to extend my coverage on this drive. I do know that, unless

It breaks down like this: When a hard drive is made, it's given a serial number and entered into a database. Because HD makers know that drives don't sell immediately, they'll add a few months to the clock, to account for a reasonable time by which the hard drive will likely be purchased. For its part, Seagate automatically adds three months to the manufacture date.

But what if the hard drive you buy has been sitting on a shelf for 12 or 24 months? Is it out of warranty the day you buy it? No. According to three major hard drive makers the Dog spoke with, a dated receipt starts the clock anew. If you lose that receipt, however, you're at the mercy of the manufacture code. HD makers say they can't base the warranty information on the date of sale as that data doesn't get back to them. Plus, some consumers might feel it's an invasion of privacy to have the retailer report their names and drive serial numbers back to the manufacturer.

The lesson here is to save your receipt—it's



The warranty on this Seagate hard drive starts from the date of manufacture—but only if you lose the receipt.

warranty. The same drives sold naked, or bare, are covered for three years. Boxed-drive buyers who want to extend their coverage, can purchase WD's \$20 "upgrade" to the three-year warranty.

Maxtor's consumer hard drives carry a standard one-year warranty from the date of sale (provided you have a receipt from an authorized Maxtor reseller), and bare internal HDs sold through a retail outlet carry a three-year warranty. Maxtor's server hard drives carry a five-year warranty.

Seagate offers a standard five-year warranty on all of its internal drives. Both Seagate and Maxtor offer a standard one-year warranty on external hard drives, similar to the warranty offered on other consumer-electronics items.

If you decide to buy a bare drive, there's a term you should be familiar with: OEM (short for "original equipment manufacturer"). Hard drives sold to major PC makers are generally known as OEM parts. If the hard drive from your Gateway or HP computer takes a dump, you typically have to go to the PC maker for recourse. Sometimes "gray market" OEM drives get sold through

IT SEEMS VERY SLIMY TO ME, AS I THINK MOST PEOPLE CONSIDER A WARRANTY TO START FROM (AT LEAST) THE DAY THEY BUY THE DEVICE.

this is standard for the industry, I won't be buying another Seagate drive and will warn my friends against it too. (Actually, because I deal with storage arrays at work and have to do occasional drive replacements, I'll be avoiding Seagate drives there as well.)

—PETE TOSCANO

THE DOG RESPONDS: It's true that drive makers can base warranties on the date of manufacture or shipping, but that's not the whole story. These dates are only applied if the consumer is unable to produce a receipt.

your only proof of when you bought the hardware. Even without a receipt, there might be some wiggle room, as Pete discovered. Every hard drive manufacturer the Dog spoke with says it has extended warranties on a case-by-case basis. Of course, it's better to avoid that question altogether, with proper receipt management.

Make Mine Naked

Interestingly, hard drive makers have different warranties depending on how the drives are sold. Western Digital's retail drives that come in boxes, for example, carry a one-year

retail stores, and they're virtually indistinguishable from the bare drives, which, obviously, blurs the lines of responsibility. Seagate, for example, takes no responsibility for OEM product of any stripe. Fortunately, the phenomenon of gray-market drives isn't as big today as it was a few years ago.

Maxtor and Western Digital say they'll honor warranties on OEM drives, but the warranties might differ from those for bare or retail drives. The lesson, again, is to save your receipt, and ask the retailer about the length of the warranty before making a purchase.

Finally, if you're curious about your hard drive's warranty, all three drive makers offer online services for you to check.

Seagate: http://support.seagate.com/customer/warranty_validation.jsp

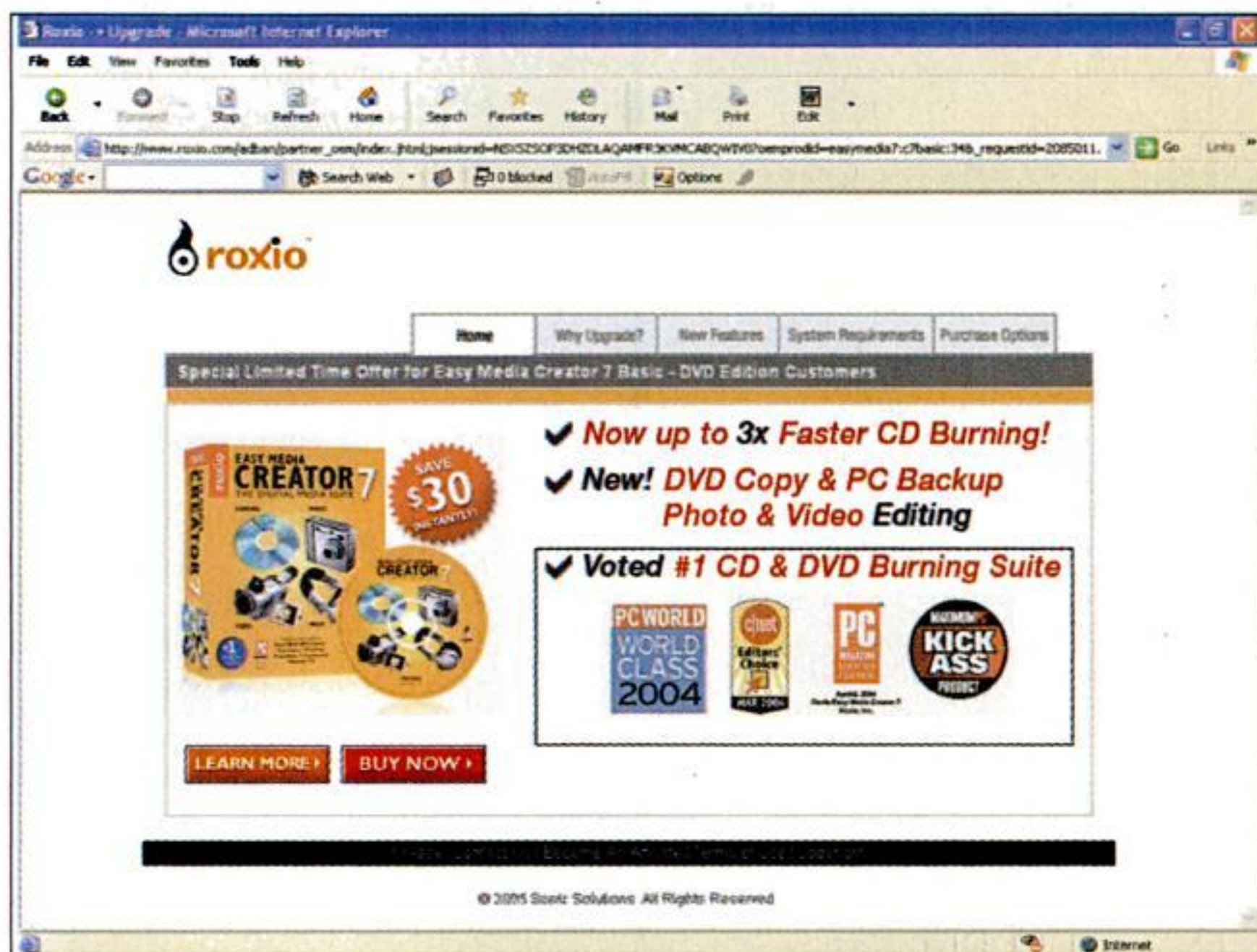
Western Digital: <http://websupport.wdc.com/warranty/serialinput.asp?custtype=end&requesttype=warranty&lang=en>

Maxtor: www4.maxtor.com/en/support/service/rma/create/01_serial_number.cfm?dt=

Still Number 1?

DEAR DOG: Although you've given Roxio high marks, and I agree that *Easy Media Creator 7*'s ease of use is sufficient for those of us who don't have video games to back up, I don't believe that *Easy Media Creator 7* was "Voted #1 CD & DVD Burning Suite" by *Maximum PC*, as Roxio proudly claims on its website.

I was directed to this page by a link



There's no misrepresentation here; Roxio indeed won awards from *Maximum PC* and the other magazines it trumpets on its website.

within the OEM version of the program, urging me to consider an upgrade to the full version. Had I not just finished reading *Maximum PC*'s "Third Annual Softy Awards" in the February issue, I might have been

influenced to make a purchase based on misinformation.

I have no doubt that Roxio did earn a Kick Ass award, and might even have been number one (probably until Nero

I MIGHT HAVE BEEN INFLUENCED TO MAKE A PURCHASE BASED ON MISINFORMATION.

RECALL ALERT

Hewlett-Packard is recalling some 16,172 HP L2035 flat-panel monitors sold in North America; incorrectly installed ground clips inside the monitors could pose a shock hazard to consumers. So far, according to HP, one person has reported being shocked by the monitor but was not injured.

The monitors were made by Philips PC peripherals and manufactured in China. Only monitors with serial numbers from CNP352Y001 to CNP423Y1HS manufactured between December 2003 and June 2004 are

part of the recall. The monitors were primarily sold for business use between February 2003 and October 2004.

HP is recommending that owners of the recalled monitors visit the recall website at www.L2035recall.com, using an alternate monitor, of course. Consumers may also call HP at 800.254.2280 between 8 a.m. and 9 p.m. EST, Monday through Friday, and 10 a.m. to 5 p.m. EST on Saturday. Consumers also can write to Philips at the following address: North America Quality and Customer Care Manager, Philips PC Peripherals, Holly Sugar Boulevard, 2 North Cascade Ave, Suite 200, Colorado Springs, CO 80903.

HP is offering to have the recalled monitors tested and repaired or replaced at no cost.

Got Recall?

Hardware vendors rarely like to admit it when they've screwed the pooch on a product design. If you know of a serious hardware recall or vendor update that's being kept on the down-low, let the Dog know at Watchdog@maximumpc.com.



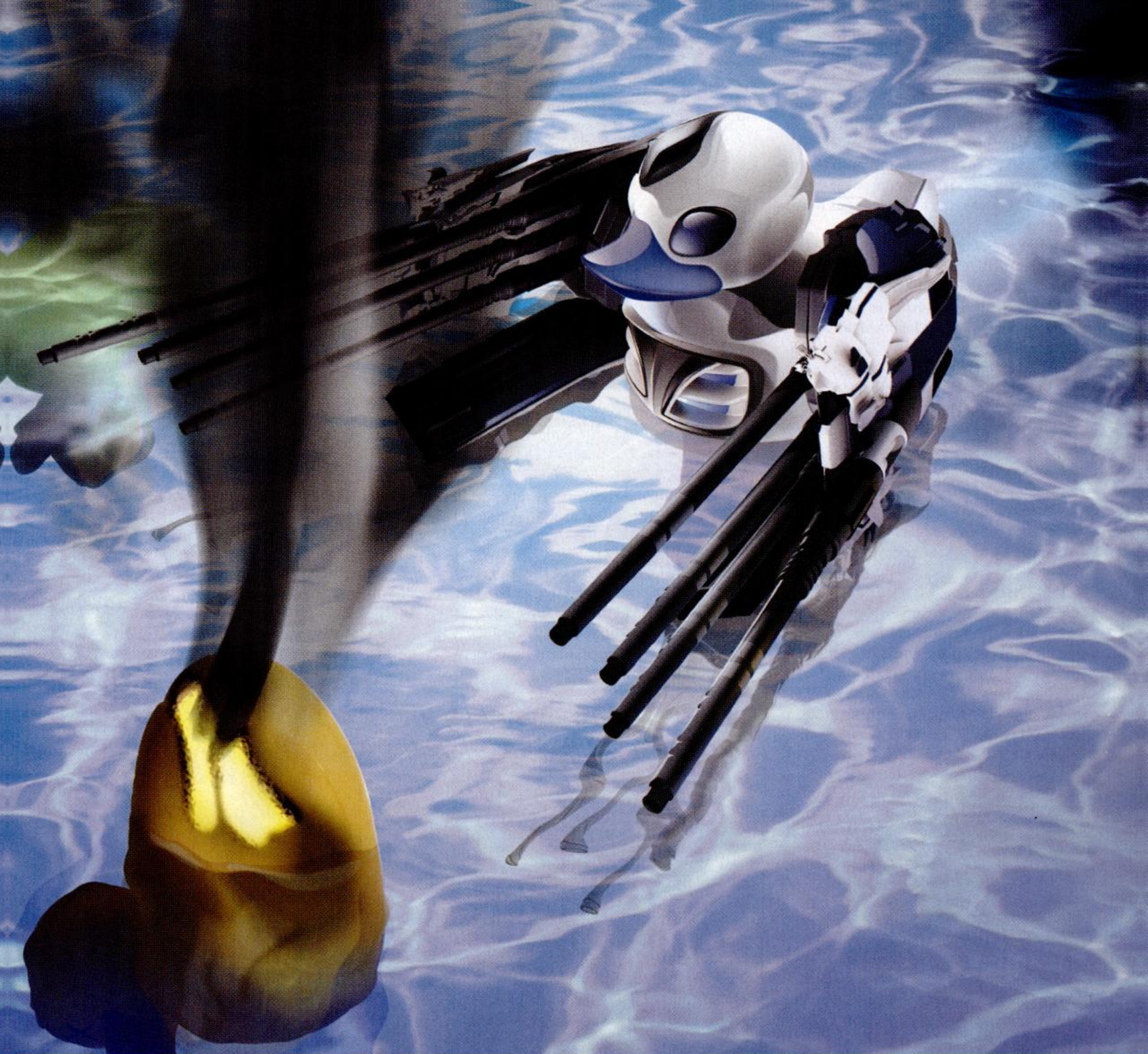
HP is recalling some of its L2035 monitors, which could pose a shock hazard.

released a revision of its competing app a few weeks later), but it is not *now* number one, and I think making the claim implies a statement about current ranks.

—REED YOUNG

THE DOG RESPONDS: The Dog can confirm that Roxio indeed scored a 9 verdict and a Kick Ass award in the July 2004 issue of this magazine. Not only that, but *Easy Media Creator 7* also managed to best the original release of *Nero 6* in *Maximum PC*'s October 2003 Head2Head. Personally, the Dog is a Nero man, but even he thinks it's well within the marketing rules of engagement for a company to pimp awards when it's for the same version of the product that was reviewed. The key lesson for a consumer is to read when and why the product received the award, and to not just accept the logo at face value. Fortunately, Roxio also includes a synopsis of the *Easy Media Creator 7* review on its website. ■

Got a bone to pick with a vendor? Been spiked by a fly-by-night operation? Sic The Dog on them by writing watchdog@maximumpc.com. The Dog promises to get to as many letters as possible, but only has four paws to work with.



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Allow us to serve as your humble guides as you seek technological enlightenment and PC performance nirvana

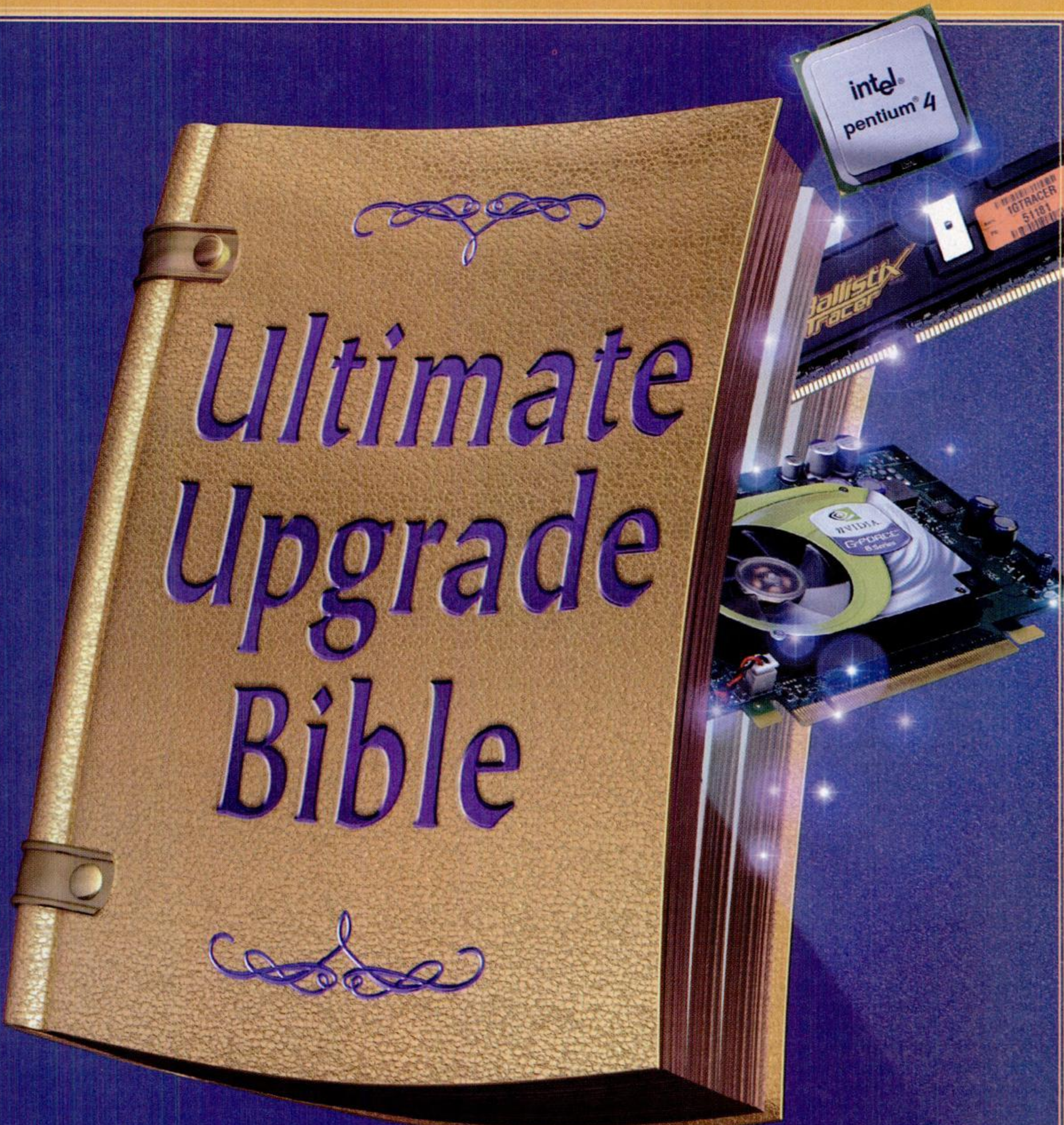
BY THE MAXIMUM PC STAFF

Some life choices are easy: Hash browns or toast? Paper or plastic? Others are more complex: Christianity or Islam? Hare Krishna or Kabbalah? It's no biggie if you wind up regretting your easy choices; but man, can it ever screw up your karma if you come down on the wrong side of the more complex choices in your life. PC upgrade choices invariably fall into this latter category.

Picking the wrong videocard could set you back \$500 and deliver little in the way of an appreciable performance gain. Opting for a faster hard drive, instead of

more RAM, might leave you wondering why you ever made the investment. And no one wants to get stuck on the losing side of a standards jihad. That's why, from time to time, the *Maximum PC* editors huddle to determine the best upgrade paths, the most promising technologies, and the truth behind the marketing dogma.

If you're truly looking for spiritual enlightenment, consult your local priest, rabbi, mullah, or guru. But if you're looking for guidance in choosing those special components that will breathe new life into your computer, you'll find the gospel truth—or at least the *Maximum PC* belief system—on the following pages.



Ultimate Upgrade Bible

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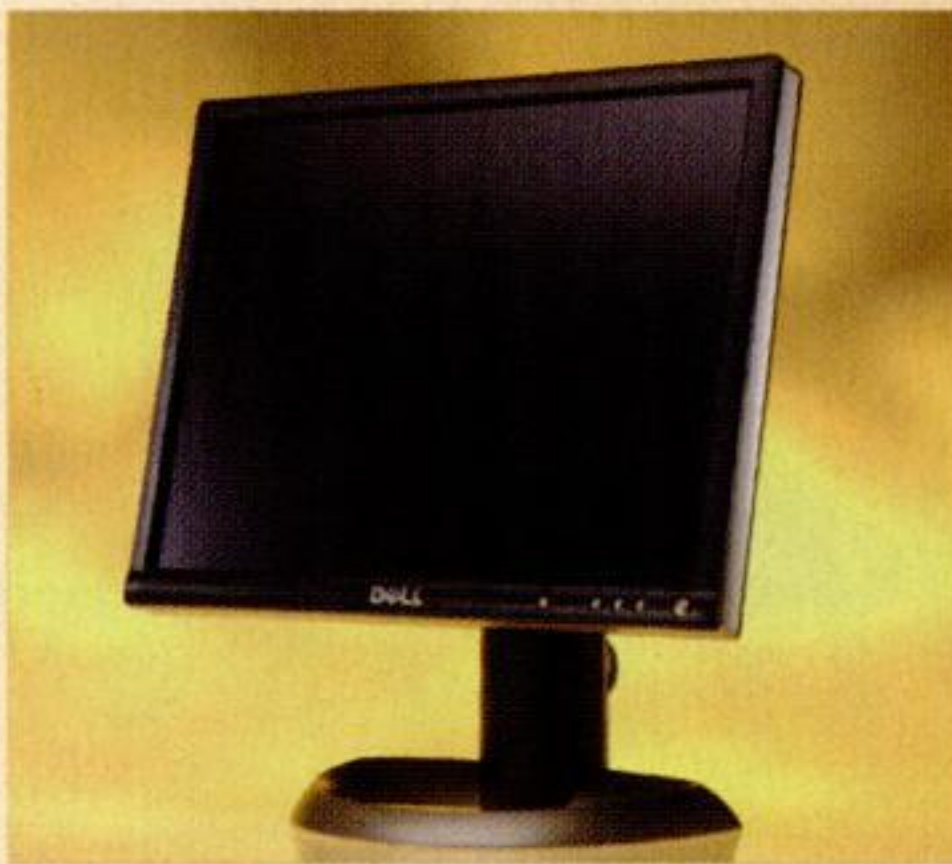
30	Monitors	36	Hard Drives/Speakers
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34	Optical Drives		

Illustration by John Harwood/Bernstein & Andriulli

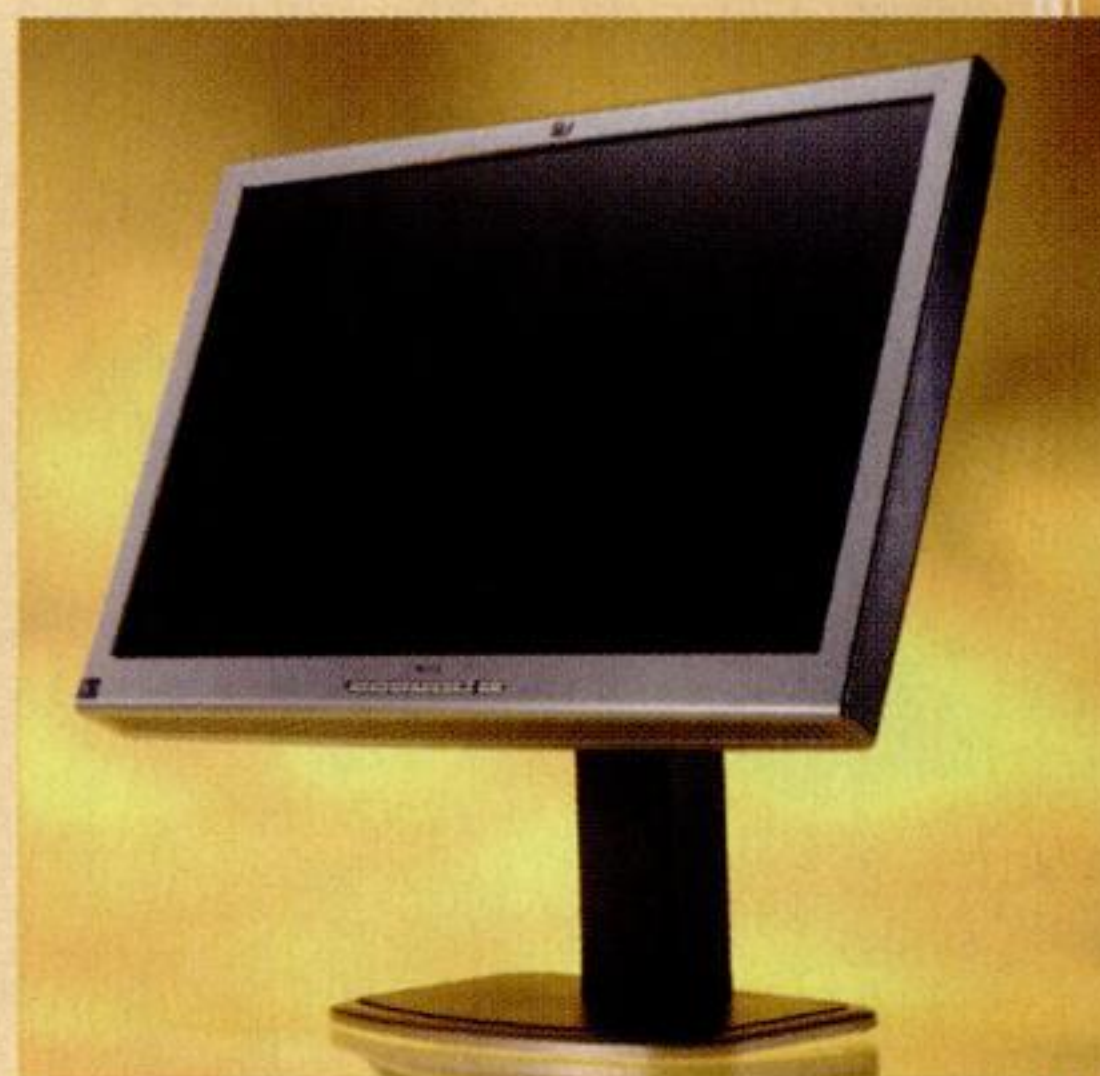
The Gospel on Monitors



NEC's FE2111SB CRT offers outstanding quality at a low cost.



Dell's 2001FP is all the reason you need to upgrade to an LCD.



The HP 2335 is big enough to do the work of two monitors.

Have you been using the same PC monitor since God knows when? Is its picture looking dull and lifeless? Does it measure less than 19 inches? If your answer is yes to any of these questions, it's high time you upgrade. And if you're a true power user, you won't stop until you have yourself a kick-ass dual-monitor setup.

Here are our recommendations for getting there.

CRT

If you're partial to CRTs (read the sidebar to understand the technology's advantages), NEC/Mitsubishi's MultiSync FE2111SB (\$600, www.nec-mitsubishi.com) is a worthy aspiration. It possesses all the requisite specs: a 20-inch viewable expanse that's perfectly flat and free of glare and reflection; aperture-grille underpinnings, with a sharp-as-a-pin 0.24mm grille pitch; a super-bright screen that achieves 1920x1440 resolution; and brilliant, true-to-life color reproduction. It all makes for a sublime visual experience, which is why the FE2111SB earned a 9 verdict and a Kick Ass award in our July 2004 issue.

LCD

The days when an LCD wasn't a viable monitor option are long gone. The technology has undergone considerable refine-

ment in recent years, and it no longer costs a fortune to have an LCD of respectable proportions. Dell's UltraSharp 2001FP (\$750, www.dell.com) illustrates these truths beautifully. This svelte, lightweight, 20-inch flat panel boasts breathtaking image quality thanks to its 1600x1200 native resolution and 0.26mm pixel pitch. Lines are sharp, colors are rich, and the picture holds up to off-axis viewing.

And to the skeptics who think an LCD is unsuitable for gaming, we say you're sadly mistaken. In fact, the 2001FP passed our May 2004 LCD gaming challenge with aplomb, performing the best in a pool of eight leading-brand contenders. Streaking and blurring were virtually undetectable in fast-motion scenes, even with the resolution interpolated to 1280x1024.

Further sweetening the deal, the 2001FP's adjustable neck tilts and rotates the display *a la* Linda Blair—it can even assume a full portrait orientation. The monitor offers a variety of input options, features a picture-in-picture mode, and can function as a four-port USB hub.

Of course, if your tastes run a tad more extravagant, there's always Hewlett-Packard's L2335 (\$1,600, www.hp.com). With a native resolution of 1920x1200 and a pixel pitch of 0.258, its picture is just that much finer than the 2001FP's—*ultra* breathtaking. It has all the same features save the USB hub, and at 23-inches, it offers considerably more screen real estate: enough

to watch DVDs in widescreen and view windows and full-size documents side by side. With this baby, we dare say you could get by with just a single monitor.

CRT, LCD, OR LSD?

With their space-saving dimensions; bright, flicker-free image quality; and plummeting price tags; LCDs seem like a shoo-in. And yet CRTs maintain an edge in a couple of key areas.

You can fine-tune the image and calibrate colors on a CRT more easily than on an LCD, for example, which makes CRTs more suitable for exacting graphics and print work. And unlike an LCD, which has a fixed number of pixels defining its resolution, CRTs are not so constrained. In order for an LCD to display at a lower resolution, it must interpolate the image, which can look horrible. If you're a gamer who frequently uses lower resolutions to squeeze out extra frames per second during multiplayer matches, a CRT might be a better choice.

As for LSD, just say "no."

The Tao of CPUs & Motherboards

How do you know when it's time to upgrade your CPU? We've developed a rule of thumb that seems to work: If you have time to take a shower while converting a CD to MP3s, it's time, child.

To wit, if you're packing a—*gasp*—Pentium II/III (or any other slot-based processor), you should decommission that box and ship it to your Granny. She'll enjoy using it to surf AOL. PCs that don't support Athlon XP chips with a 333MHz or faster front-side bus, or Socket 478 Pentium 4 procs with a FSB slower than 800MHz should be parceled out to siblings for whom a good time with the computer amounts to entering receipts into *Quicken*.

The two remaining camps—333/400MHz FSB-capable Athlon XPs and 800MHz FSB-capable P4s—top out at serviceable speeds. For the AMD, assuming your motherboard vendor hasn't flubbed the board's design, you should be able to hit 3200+ or 2.2GHz. The Socket 478 crowd should be able to take it as far as a 3.4GHz P4 Northwood, or even an Extreme Edition if you have the ducats to burn. For anything slower, it's probably best to retire the whole tamale.

If you're looking for a complete upgrade, our top pick is AMD's Athlon 64 FX-55 processor (\$1,000, www.amd.com). Widely acknowledged as today's performance leader for games and many other applications, this 2.6GHz chip features an on-die memory controller for blazing-fast speed and forward-looking support for both NX and 64-bit operating systems and applications. Now that PCI Express motherboards are starting to dribble out, the only feature this chip *doesn't* have is DDR2 support. Fortunately, there's no real performance benefit to be had from DDR2 today. That might change in the future, but it's not worth breaking a sweat over right now (see our RAM section on page 32 for details).

We recommend that you pair any Socket 939 CPU with Asus' A8N-SLI Deluxe motherboard (\$210, www.asus.com). This mobo uses the nForce4 SLI chipset and lets you run two videocards at once. AMD actually has three socket solutions for consumers: Socket 754 for budget shoppers, Socket 939 for perfor-

mance users, and the obsolete Socket 940. We're sticking with the Socket 939 because we believe it offers the best balance of performance options and future upgrades. If you never intend to run two videocards, consider a board that uses the nForce4 Ultra chipset (skip the plain-Jane nForce4).

Later this year, AMD will introduce its first CPUs that feature dual-core technology (essentially two CPUs in one package). There's a 50-percent chance these CPUs will drop into the current Socket 939 motherboards and work, but we can't be sure just yet, and AMD's not telling.

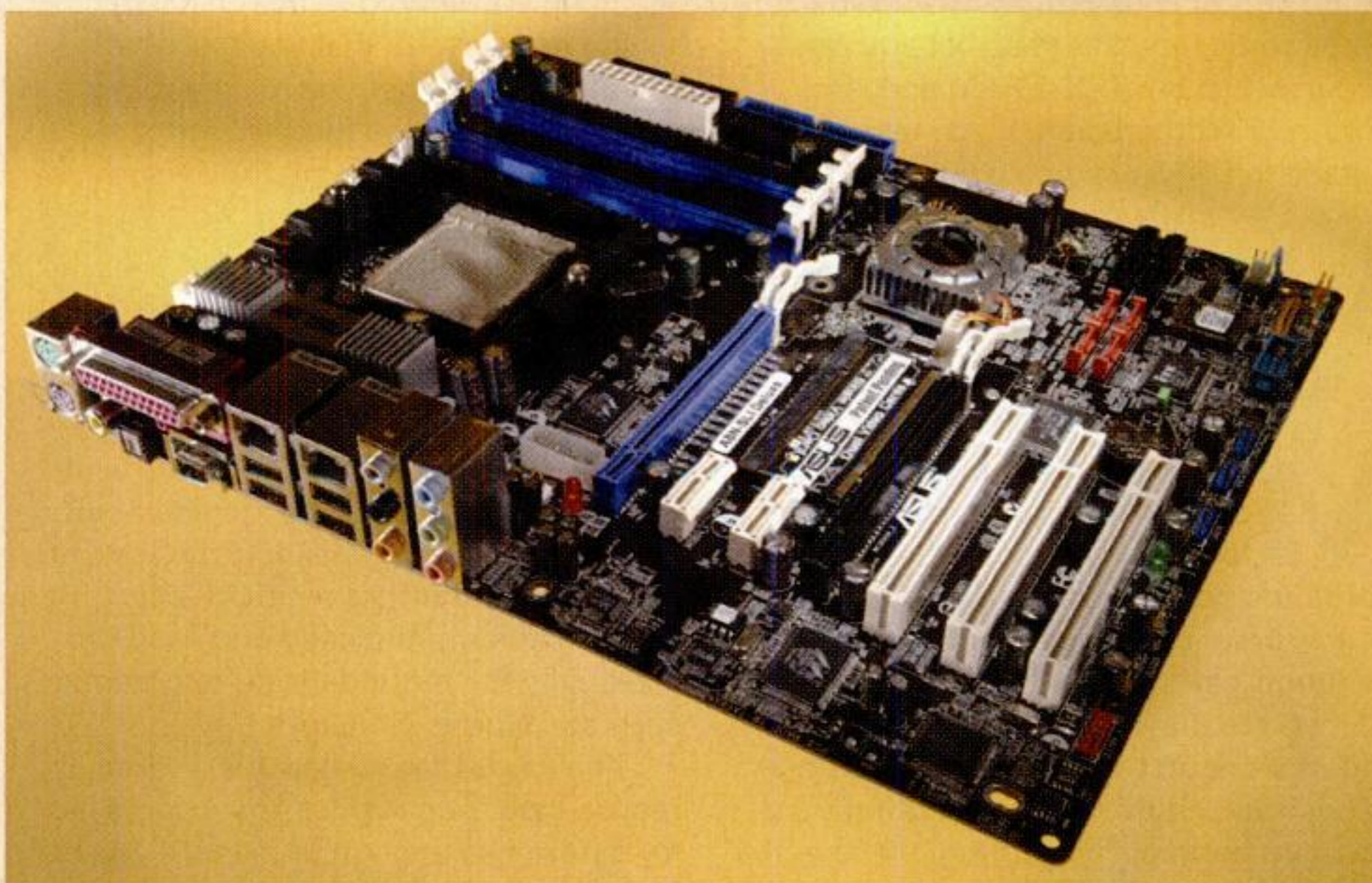
Many people still prefer the warm, fuzzy embrace of Intel hardware, and we can't blame 'em: There's nothing like being cradled in the womb of the world's largest semiconductor company. As with AMD, however, there's more than a little confusion swirling around the P4 socket strategy. Socket 423 has been obsolete for years and should be avoided (assuming you can even find one for sale). Socket 478 is the last generation of P4. These motherboards are top notch, but officially on the decline; as such, your upgrade options will be extremely limited over the next 12 months.

Motherboards that support Intel's LGA775 processor package and



AMD's Athlon 64 FX-55 is at the pinnacle of performance and features.

1066MHz front-side bus CPUs are the state of the art in Intel land, and Asus' P5AD2-E Premium (\$240, www.asus.com) is our top pick in this category. But that recommendation carries a major caveat now that Intel is about to introduce dual-core processors. We previously believed the current crop of boards would also work with these new procs, but now we're hearing rumblings that they might not. If in fact they don't, LGA775 boards will be quickly orphaned. *Ouch*.



With an A8N-SLI Deluxe and two cards running in SLI mode, you've got the motherboard equivalent of owning Park Place and Boardwalk.

The Power Supply Epistles

We're still picking the shrapnel out of our ass cheeks after our last power-supply roundup; but hey, it's clear that not all power supplies are the same. That shouldn't come as a surprise to anyone who's listened to our pontifications over the years; but to the unwashed masses, the lesson is simple: A quality power supply is *absolutely critical* to your system's stability. With new PC components sucking up power like a Hummer slugging fossil fuel, you simply can't count on your 3-year-old power supply to get you through *any* major upgrade. Plug in your 6800 Ultra, a clocked-up Prescott P4 or FX-55, and a couple of Raptors, and you'll be treated to the acrid smell of fried PSU in the morning. If it

doesn't blow up within 24 hours of a major upgrade, it'll definitely give up the ghost on a summer afternoon when your bungalow hits a balmy 90 degrees Fahrenheit.

Our top pick for a high-wattage PSU is PC Power and Cooling's Turbo Cool 510 Deluxe Express (\$195, www.pcpowerandcooling.com). Although a tad loud under load, we have no fear that any system could break this PSU—and nVidia has officially certified it to support SLI. Even better, there's an SLI unit that's wired for two graphics cards. If you don't intend to run an SLI machine, are less noise tolerant, and desire removable cables, Antec's NeoPower 480 (\$200, www.antec.com) is an economical and quiet alternative that falls just short of delivering the power required by SLI.



The Turbo Cool 510 Deluxe Express has enough power to drive an SLI machine, and then some.

The RAM Koran

Is DDR2 worth its upgrade cost? The short answer is no; at least not now. Because of the memory latencies associated with DDR2 (which are by design higher than that of DDR), both the 400MHz and 533MHz grades aren't strong enough on their own to merit the expense of an upgrade. That doesn't mean DDR2 is a failure; in fact, if you think of DDR2 as the first-speed grades of the original DDR (200 and 266), we haven't hit the speeds where DDR2 will show its stuff (which will likely be around 667- or 800MHz). We *will* see those speeds some time this year, but you can't, of course, just buy DDR2 RAM and jam it into your motherboard. If you intend to upgrade to DDR2 at some point, you'll need

to take that into account when you choose your CPU and motherboard. Only Intel CPUs offer DDR2 support today. The presence of an on-die memory controller on AMD's Athlon 64 and Athlon 64 FX means AMD must re-spin the core to add support for newer memory types and speeds.

As with their choice of power supply, many people treat memory as a commodity—to their detriment. They buy the cheapest RAM they can find, and then whine about getting blue screens. If there's one thing you should remember about buying memory, it's that you get what you pay for. Whether you're upgrading or building anew, we recommend that you purchase brand-name RAM—such as



Corsair's XMS Xpert series of DDR memory includes a programmable LED that tells you the RAM's voltage, temperature, and bus frequency.

Corsair, Crucial, or Kingston—in order to avoid problems that can require hours of troubleshooting to fix. As far as quantity of RAM, 512MB isn't acceptable; most people should upgrade to at least 1GB (a 2GB helping is rapidly becoming the norm).

A Mantra on Mice

Most PC manufacturers ship optical mice with underperforming sensors—we're talking a piddling resolution of 400dpi or less. Even worse, you might be laboring with a vintage ball mouse.

If you're playing games or doing any kind of work on the PC that requires precision, you should consider picking up a premium mouse. For gaming, we love the Razer Diamondback (\$60, www.razerzone.com). Its 1,600dpi sensor captures movement at a whopping 6,400fps. No matter

how fast we move the mouse, we can't make it lose its track. The included software has several gamer-specific features, including on-the-fly sensitivity adjustment so you can automatically decrease the sensitivity for more delicate operations, such as sniping. *Brilliant!*

The Razer Diamondback is a wired mouse, however, and we know some folks have had enough of those. If you're in that camp, we consider the Logitech MX1000 (\$80, www.logitech.com) to be the best-performing wireless alternative. It



The Diamondback isn't the prettiest mouse on the block, but it'll save your hide in multiplayer.

uses a special laser sensor, instead of the traditional LED, to deliver a smooth, precise feel. The MX1000 lacks the on-the-fly sensitivity adjustments we like so much in the Diamondback, but it's still a close second.

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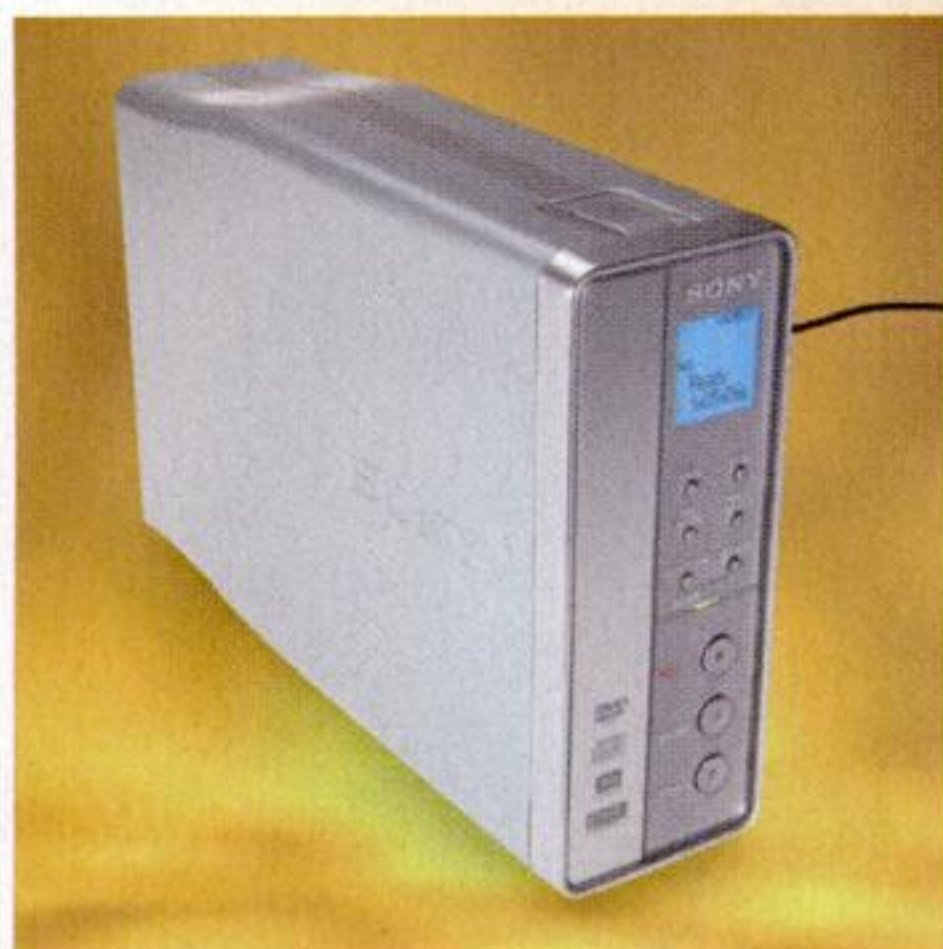
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The Bhagavad Gita of Optical Drives

The prices on DVD burners are so low these days that they're almost paying *you* to take them home. You can get a high-speed burner for less than \$100—that's not much more than the bundled software would cost you if you bought it separately. But, wouldn't you know, there's a catch: High-speed 16x recordable DVD media remains very expensive, and new DVD burners often advertise speeds that are impossible for



Video capture, high-speed DVD burning, and just plain foxiness—that's Sony's DVDirect.

the user to achieve because there's no media available to support them.

Even worse, *Maximum PC's* own optical-drive industry Deep Throat tells us that prices for double-layer media—hovering around \$10 a piece at press time—aren't expected to drop much this year, if at all (thanks to high failure rates at the factory). So we beg of you: Don't let emotion overwhelm reason and simply grab the box with the highest X-speeds on it. Instead, follow these simple upgrade guidelines:

The killer function of a DVD burners is, of course, burning DVD-Video discs that play in your set-top player. We all have mounds of VHS and Hi8 analog footage that ought to be transferred to DVD so the tapes can be retired with dignity. The easiest way to do this—and by "easy" we mean with two button press-

es—is to use Sony's DVDirect burner (\$300, www.sonymstyle.com). Not only does it capture and burn in real time directly to disc, but it also places chapter stops at any interval you specify; and when connected to a PC, it magically transforms into an external DVD burner that can burn at up to 16x on single-layer media and 2.4x on double-layer media.

If you want speed and can do without the video-capture feature that makes the DVDirect so expensive, turn to Plextor's PX-716A (\$140, www.plextor.com). This winner of a drive not only delivers record-breaking burn speeds and seek times, but a ton of other features—including disc-based password protection and a toolkit for checking disc quality—that aren't available with any other drive. The PX-716A's price premium is easily offset by its capacity for writing to certain types of media at speeds much higher than they're rated for (we were able to burn at 16x on a relatively inexpensive 8x disc).

If you'd rather save the bucks up front, we recommend NEC's ND-3500A (\$100, www.necsam.com). This drive is particularly fast writing to single-layer media—which is what you'll be using most of the time—and like the PX-716A, it can write to certain types of media in excess of the rated speed (although we found that this trick worked on a much narrower spectrum of media than the Plextor drive). If you can't find the ND-3500A, the ND-3520A is the OEM version, but it doesn't include any software.



The sexy Plexy is back and faster than ever. The PX-716A outshines every other optical drive in overall speed and features.



With an MSRP of \$99, the ND-3500A was the first double-layer drive to break the \$100 barrier, and it did so without cutting corners.

BLU-RAY OR HD-DVD?

Holding out for the next-generation optical-drive standard? Don't bother. Everyone's been chatting about the huge capacity of these drives, but few mention the huge prices the first-generation players and recorders will command. Picking the wrong side in this standards war could leave you feeling mighty Betamaxed.

For what it's worth, *Maximum PC* is rooting for HD-DVD. The technology has the same speed and almost as much capacity per disc as Blu-ray, but unlike its competitor, it doesn't require new manufacturing processes: Current DVD-production facilities can be rejiggered to produce the media, which will translate into significantly lower prices for consumers.

Industry insiders, however, tell us that the opinion that carries the most weight belongs to the folks producing "adult entertainment." The format they choose, we're told, is what consumers are likely to get; and in a bit of poetic justice, insiders' whispers suggest the blue-movie makers are leaning toward Blu-ray.

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Hard Drive Homilies

Despite our highly public love affair with Western Digital's 10,000rpm Raptor drives, upgrading to such a drive isn't always money well-spent. Raptors deliver benchmark-shredding performance, but this benefit must be measured against the drives' puny capacities of just 36- and 74GB; plus, they're *crazy* expensive. The 74GB model, with its near-\$200 price tag, costs more than drives boasting more than four times the capacity. Is the speed worth it? It is for some. If you already have a high-capacity drive and want more speed for your OS and apps, running a Raptor as your primary drive and shifting your current drive into storage-warehouse mode is a sweet setup. In fact, several *Maximum PC* staffers have their home rigs configured just this way. Your PC will boot faster, apps will load faster, and you'll be very popular on the Internet forums. But if money's tight, we highly recommend sticking with your 7,200rpm drive.

If you simply *must* upgrade, and you want the most drive for your dollar, visit the local Maxtor showroom and check out



Whether your upgrade requirements call for more speed, more capacity, or both, you can't go wrong with the 250- and 300GB varieties of Maxtor's DiamondMax 10 hard drives.

either the 250- or 300GB DiamondMax 10 drives (from \$150, www.maxtor.com). These drives boast a 16MB buffer, which pays huge dividends in a desktop environment because you're usually accessing the same files and apps over and over. These drives

are within spitting distance of the Raptors in benchmark tests, thanks to their *huge* buffers and tightly packed platters.

Most people looking for a no-frills upgrade are faced with the quandary of sticking with tried-and-true parallel ATA, or springing for the much talked-about Serial ATA spec. We haven't seen SATA deliver any significant performance differences so far, but it does eliminate the need to set jumpers and it does simplify cable management.

Every high-performance desktop drive on the market today is offered in both interfaces, but the drives themselves are often mechanically identical. Then again, some manufacturers are beginning to include next-generation features—such as native command queuing and 3Gb/s of bandwidth—to their newest SATA drives (features that aren't available on their PATA models). If the difference in price between the PATA model and the SATA model is negligible, then go with SATA; but most home users won't see a big enough performance boost to justify a premium price.

The Talmud of Speakers

Whether you use your computer to play games, watch movies, stream video, listen to music, or rip MP3s, we cannot overemphasize the importance of having a good set of speakers. Headphones are great for those times when you don't want to rock the entire house, but you can't rely on them to tell you how the music you're working on will sound when played on loudspeakers. That's why recording-studio engineers always fall back to listening to their work on a good set of studio monitors.

Because you're unlikely to plug your PC's audio into a stereo receiver or a dedicated amplifier, you'll need to buy a set of self-powered speakers. And although just about every "multimedia" speaker system on the market these days is self-powered, the overwhelming majority of these systems are absolute crap. Fortunately, we have two recommendations for you.

If you use your PC to produce music,

either in a home-studio environment or just to rip MP3s from the CDs you purchase, you should go for a simple powered two-channel studio-monitor system. Studio monitors are designed to not add any "color" to the audio they produce, so what you hear through them is as accurate as possible. We recently gave a listen to M-Audio's StudioPro 4 near-field monitors (\$200, www.m-audio.com) and came away quite impressed. You'll find our full review on page 79 in this issue.

If you've taken a liking to DVD-Audio, watch DVD movies, or play games on your PC, you'll want a home-theater speaker system. These consist of front, center, and surround channels, augmented by a powered subwoofer that produces very low frequencies. On that score, it's tough to beat Logitech's Z-5500 Digital (\$400, www.logitech.com). This monster



If you're looking for the ultimate in sonic splendor from your games, music, and movies, Logitech's Z-5500 Digital speaker system can't be beat.

5.1-channel system features a massive 500-watt amplifier, a built-in decoder for DTS 96/24 (96kHz/24-bit digital-audio streams), two remote controls (one of which is wireless), and no fewer than six audio inputs.

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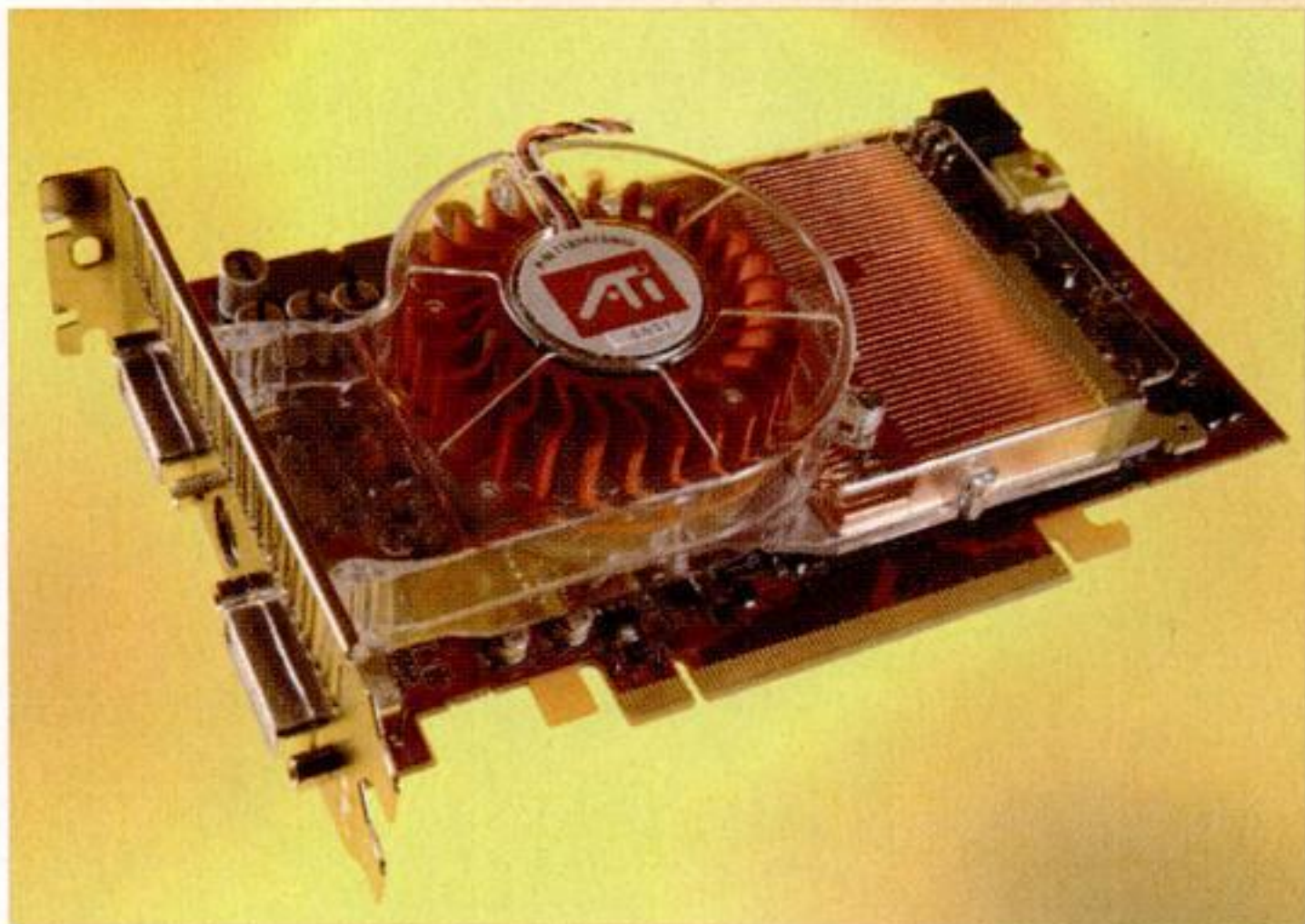
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The Dharma of Videocards



The Radeon X850 XT's dual-slot cooler moves a lot of air—a good thing, because this card is smokin' fast!



Pairing up PCI Express GeForce 6800 Ultra cards for dual-GPU performance is an attractive, but expensive, option.

It's a dilemma every PC gaming aficionado will face in the next year: Should you upgrade to PCI Express, or stick with your AGP system for one more upgrade cycle? Let's look at the criteria you should apply when it's time to confront the matter.

If you own a current-generation AGP videocard, we strongly encourage you to stick with your AGP system until the next-gen videocards ship late this year or early next. You'll see only a negligible performance increase switching from the AGP to the PCI Express bus; one that's definitely *not* worth the cost of upgrading your CPU, motherboard, and videocard all at once.

If, on the other hand, you passed over the AGP versions of the Radeon X800 and GeForce 6800 boards, you could realize a huge performance increase by moving to a PCI Express videocard. But we're going to repeat ourselves here, because it's very important: *You will not see a performance gain if you move from a current-generation AGP card to a PCI Express card.* None of today's applications are bottlenecked by the available bandwidth between the videocard and the rest of the system.

Your current CPU should also factor into your consideration. If you're ready for a CPU and motherboard upgrade (or if you're buying a whole new system), make the jump to PCI Express.

You'll have to make the switch at some point in the not-too-distant future anyway, so there's no point in putting off the inevitable. You can be assured that none of the *Maximum PC* editors are sinking their hard-earned dollars into new AGP-based machines.

Once you've chosen your interface, you need to decide how much money you want to spend on your videocard. There are basically three price ranges to consider: sub-\$200, \$200 to \$400, and \$400 and up. The sub-\$200 cards are all suitable for 2D work, but they're underpowered for today's games. In

the midrange, you'll find cards that are acceptable for gaming, but you won't be able to run *newer* games with all their settings cranked up. High-end videocards are so powerful that the performance bottleneck for gaming shifts from the videocard to the CPU. That means you'll be able to play games at ridiculously high resolutions, with antialiasing and anisotropic filtering cranked all the way up—as long as your CPU has the brawn to handle its part of the job.

If you're not a gamer, there's *absolutely no reason* to spring for an expensive gaming card.

WHOSE KOOL-AID SHOULD I DRINK?

Oooh, this is a tough question. But here's what it really boils down to: Do you want to shell out the cash for a dual-card SLI system, or would you rather spend a little less on a still very-fast stand-alone card? ATI's Radeon X850 XT (\$550, www.ati.com) is the fastest stand-alone card, but it's significantly slower than a pair of GeForce 6800 GT boards running in SLI mode (\$400 each, www.nvidia.com). If you want to go all the way, and pair up two GeForce 6800 Ultras (\$500 each), you'll

see even faster performance.

Because the performance of most games is limited more by the CPU than the videocard, there's not a whole lot of performance difference between ATI and nVidia cards in the real world. If you're not interested in ever running an SLI rig, spend your money on the ATI Radeon X850 XT. If you think SLI might be in your future, pick up a GeForce 6800 Ultra. You won't be disappointed either way; they're both kick-ass cards.

Soundcard Psalms

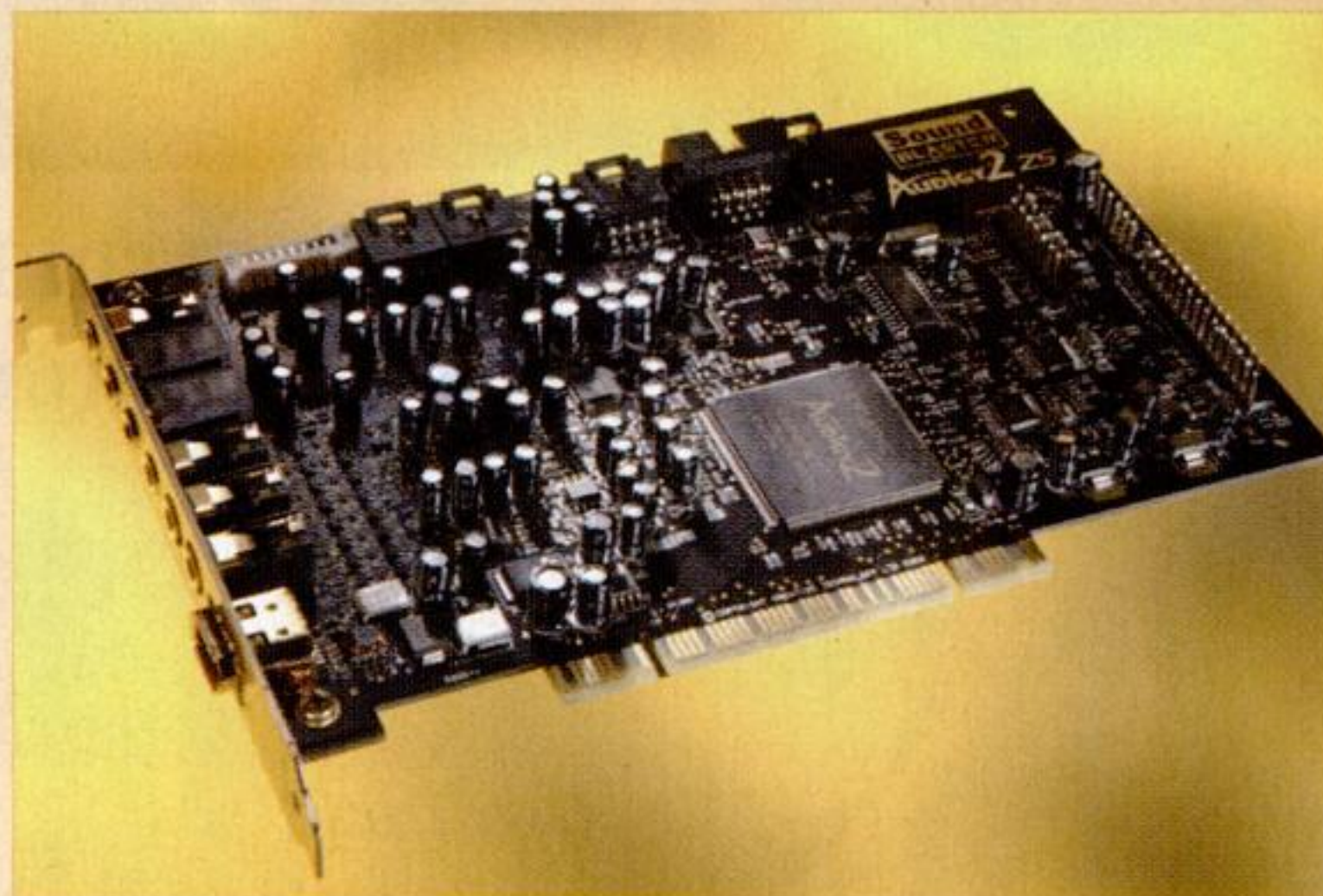
Intel couldn't kill videocards, but the company is well on its way to wiping out the soundcard. Thanks to its HD Audio spec, consumers will get higher-quality audio-compression and such previously expensive features as real-time Dolby Digital encoding "for free" with the motherboard.

These developments notwithstanding, we believe it's a little early to start playing Taps for the soundcard market. Onboard audio has certainly come far from its humble, tin-eared beginnings, but there's no getting around the fact that motherboards are basically a huge jangle of wires held in place by a printed circuit board (PCB). Wires generate electrical noise, and electrical noise degrades audio fidelity. Because soundcards are physically farther away from the din of a motherboard's electronic chatter, they almost always sound cleaner and better.

There are two types of soundcards: those with a digital signal processor (DSP) that do their own audio processing, and those that rely on your CPU to do all the heavy lifting. The pickings

are slim for DSP-based consumer soundcards, with Creative Labs' Audigy 2 ZS series (from \$100, www.creative.com) being among the last of its kind. It features eight-channel audio, a FireWire port, crisp 108dB signal-to-noise ratio, and it enables you to play high-definition DVD-Audio discs (you'll need to purchase a software decoder to view the video content on these discs).

If that's not enough audio power for you, take a look at the Audigy 4 Pro (no Audigy 3 ever materialized). The Audigy 4 Pro (\$300, www.creative.com) offers even better digital-to-analog converters, but



The Audigy 2 ZS is the only consumer-grade soundcard to feature a dedicated digital signal processor.

it's expensive and must be purchased directly from the manufacturer. Creative is apparently putting significant effort into a next-generation audio chip, the capabilities of which have been hinted at, but remain secret. ■

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PCs, monitors, peripherals, and especially batteries contain all kinds of nasty materials that, irresponsibly disposed of, can turn healthy, lush forests into steaming wastelands of horror and light spring rain into a black, viscous fluid that dissolves flesh on contact. Fortunately, it's in our power to prevent this apocalyptic nightmare by taking advantage of simple, cheap, and surprisingly convenient recycling programs.

Before you dispose of that old PC, however, make absolutely sure you've eliminated all traces of your personal data. This means not only formatting the drive, for instance, but writing over the contents of each sector multiple times. There are many applications that automate this process, including *Steganos Security Suite* (\$60, www.steganos.com) and the free, open-source

Eraser (www.heidi.ie/eraser/). Make sure all media is removed from optical drives, floppy drives, and media readers, too.

➔ You might not think your pokey 5,400rpm drive or GeForce3 videocard is worth much anymore, but who knows—someone, somewhere may be looking for just that piece of hardware. And, of course, they'll be looking for it on eBay (www.ebay.com).

➔ Part advocate and part activist, Computer TakeBack (www.computertakeback.com) is a watchdog organization that monitors "e-waste" legislation, and they take delight in shaming companies with particularly egregious disposal policies. Visit their home page and you'll find a map of

the United States. Click your state, and you'll be whisked to a list of local "responsible recyclers" who have pledged to adhere to a very long and tedious list of guidelines regarding the disassembly and disposal of orphaned hardware.

➔ Dell has the best, most affordable recycling program we know of. The company will pick up your PC hardware—from any manufacturer—for just \$15 per every 50 pounds of stuff. Go to www.dell4me.com/recycling for more information.

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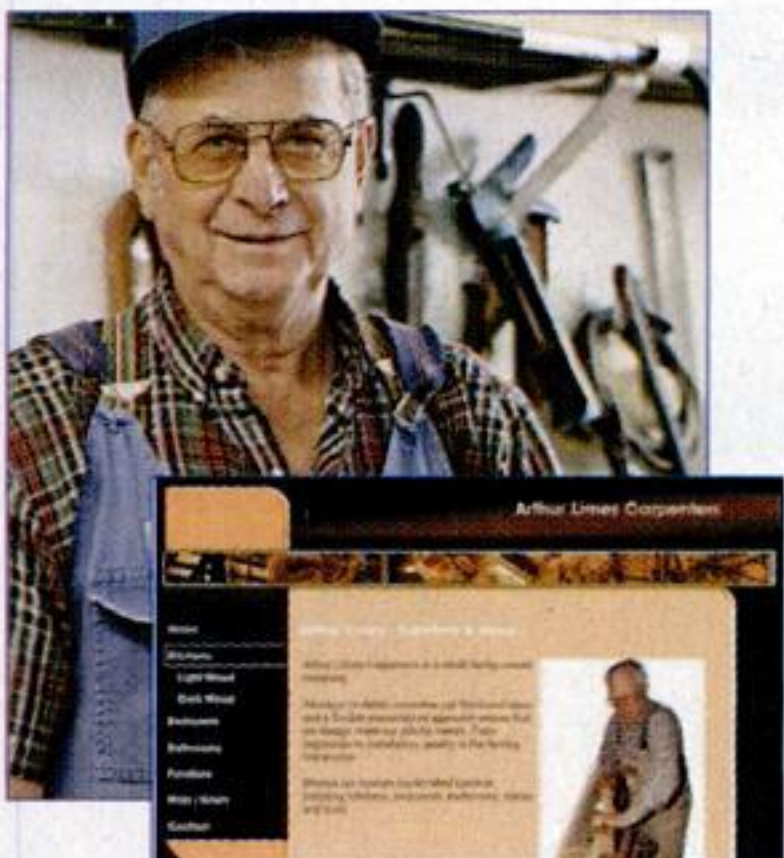
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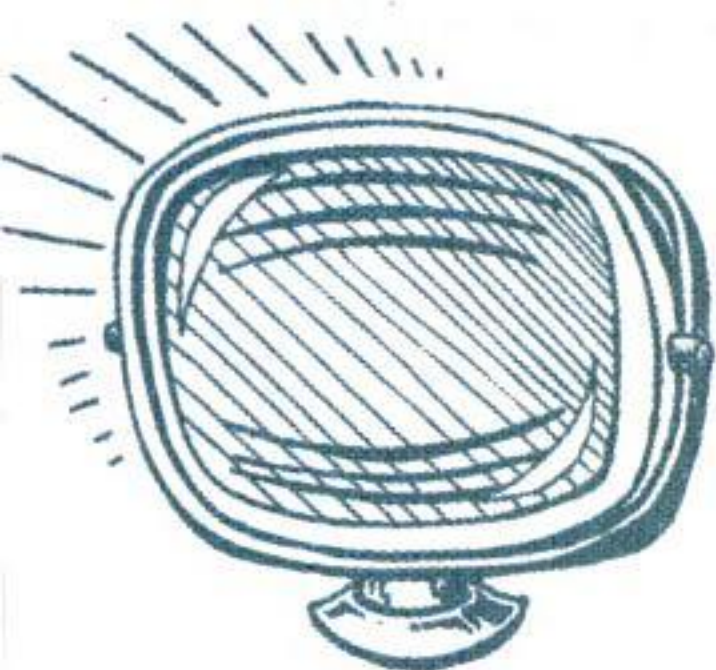


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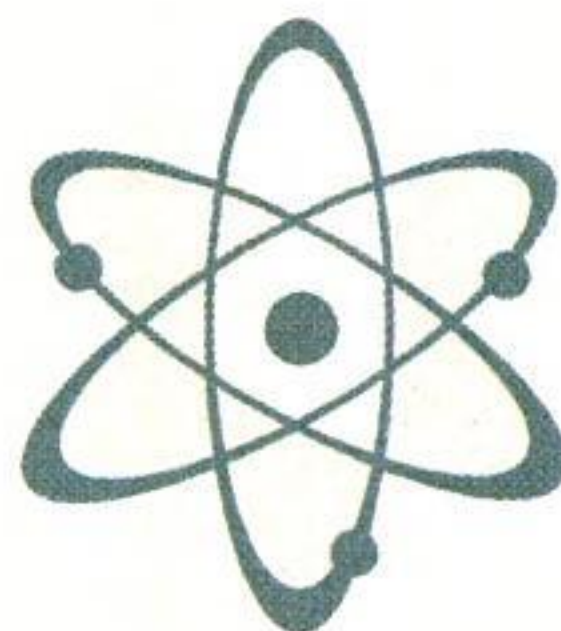
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fascinating world of computers?*

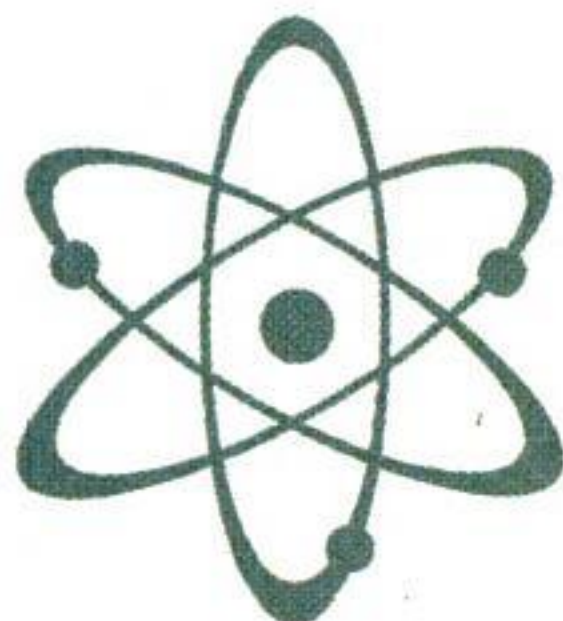


Hey, kids! Ready for some fun? We sure are! We've put together an exciting quiz we just know you'll enjoy—maybe out in the park after baseball practice, or while you're riding the bus to school. In fact, you can take this test just about anywhere, anytime. Why not make a game of it? Have your friends take the test at the same time, and then compare your scores! It's a fun and educational way to test your knowledge of the exciting world of electronics; especially the thrilling science behind personal computers.

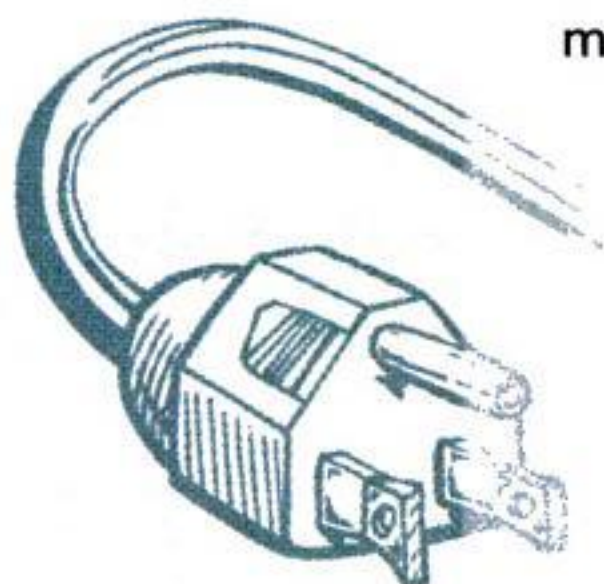


You, in the back, we hear you grumbling: "What's so important about dumb ol' computers, anyway?" Well, pouty-face, without computers, it would be much harder to fly a plane or do complicated math. In fact, there are few jobs left that don't involve computers in some way. One of those jobs is cleaning the bathroom in the town skating rink. Another one is plucking the feathers off dead chickens at the poultry-processing plant. Is this the kind of work you want to do when you grow up? No? Well then, you'd better get some computer smarts. And the best way to start is to discover what you don't know.

So grab a #2 pencil for our most challenging Geek Quiz ever. Give yourself a point—or in some cases, two points—for every correct answer (you'll find the answers at the bottom of each page. No cheating!). When you're done, tally up your score and measure it against the Geek-o-Meter at the end of the quiz. A high score means you're ready for the dazzling world of the future. A low score means... well, you better get used to the smell of dead chickens.



All illustrations by
Matt Osborn



This workbook belongs to:



GEEK QUIZ 2005

1 Reed-Solomon is a type of what?

- A. Digital error correction
- B. Video compression
- C. Secure packet transmission
- D. Data compression

2 Demuxing an MPEG-2 file:

- A. Removes quantization file header data
- B. Corrects audio/video desynchronization
- C. Separates the audio and video streams into two files
- D. Corrects the aspect ratio of an anamorphic video stream

3 Which kind of touch screen detects contact through pressure?

- A. Resistive
- B. Capacitive
- C. Conductive
- D. Inductive

4 An ExpressCard is:

- A. A new formfactor for x4 PCI Express add-in cards
- B. A PCI Sig spec for SLI-enabled video-cards
- C. A new formfactor to replace PC Cards
- D. The official name for PCI Express graphics cards

5 Which company did IBM sell its PC division to?

- A. Lenovo
- B. Gramont
- C. Fingerhut
- D. LG

6 Which gas is used in some projector lamps?

- A. Xenon
- B. Freon
- C. Laughing
- D. Diastolic

7 Wavelength division multiplexing is used in which technology?

- A. Voice actuators
- B. Lossless audio compression
- C. Video artifact suppression
- D. Fiber-optic networking

8 What will you never find in an EPS file?

- A. Audio cues
- B. An illustration
- C. The complete text of the Bible
- D. Crop marks

9 What's the name of Apple's proprietary digital rights management scheme?

- A. PlayFair
- B. FairPlay
- C. PlayMore
- D. Claymore

10 Bluetooth operates at what frequency range?

- A. 2.4 megahertz
- B. 9 megahertz
- C. 2.4 gigahertz
- D. 5.4 gigahertz

11 Intel's 2700G is:

- A. A high-definition digital signal processor (DSP)
- B. The first onboard audio chipset to support 24-bit recording
- C. A spec for custom-designed media-acceleration chips
- D. A graphics accelerator for handhelds

Worth 2 points!

12 Match the chipset drivers:

- | | |
|-----------|-----------------------|
| 1. VIA | A. INF Update Utility |
| 2. nVidia | B. ForceWare |
| 3. ATI | C. Catalyst |
| 4. Intel | D. Hyperion |

13 All DVD-Videos have VOB files. What does the acronym mean?

- A. Visual object bit
- B. Video operation base
- C. Visual operation bit
- D. Video object

14 Which one of these features is not part of the Advanced SATA or SATA II specification for hard drives?

- A. Native command queuing
- B. 300MB/s bandwidth
- C. Staggered spin-up
- D. 16MB buffer

15 What chipset has the fastest interconnect speed between the north and south bridge?

- A. SiS756/SiS965
- B. VIA K8T90
- C. Intel 915P
- D. nVidia nForce4 Ultra

16 Commercial DVD-Videos are made by:

- A. Etching
- B. Burning
- C. Stamping
- D. Dye polarization

PC HISTORY



17 What was the name of 3dfx's proprietary graphics acceleration language?

- A. Pride
- B. Stride
- C. Slide
- D. Glide

18 Who invented Tetris?

- A. Nadezdha Kalmykov
- B. Alexey Pajitnov
- C. Dmitri Sklyarov
- D. Ivan Pavlov

19 What was the first version of Windows to include Solitaire?

- A. Windows 2.0
- B. Windows 3.0
- C. Windows 3.1
- D. Windows for Workgroups

20 IBM was the first company to market the "personal computer" to the regular department store consumer. When was the groundbreaking IBM 5150 PC unveiled?

- A. 1978
- B. 1980
- C. 1981
- D. 1986

21 Everyone knows Moore's law. What was Moore's first name?

- A. Eric
- B. Milo
- C. Michael
- D. Gordon

22 In Seagate's 7200.8 hard drive series, the "8" in the name indicates:

- A. An 8MB buffer
- B. It's the eighth generation of drives
- C. It has eight platters
- D. It has eight read/write heads

23 When discussing average continuous output from a speaker system, the term "RMS" stands for:

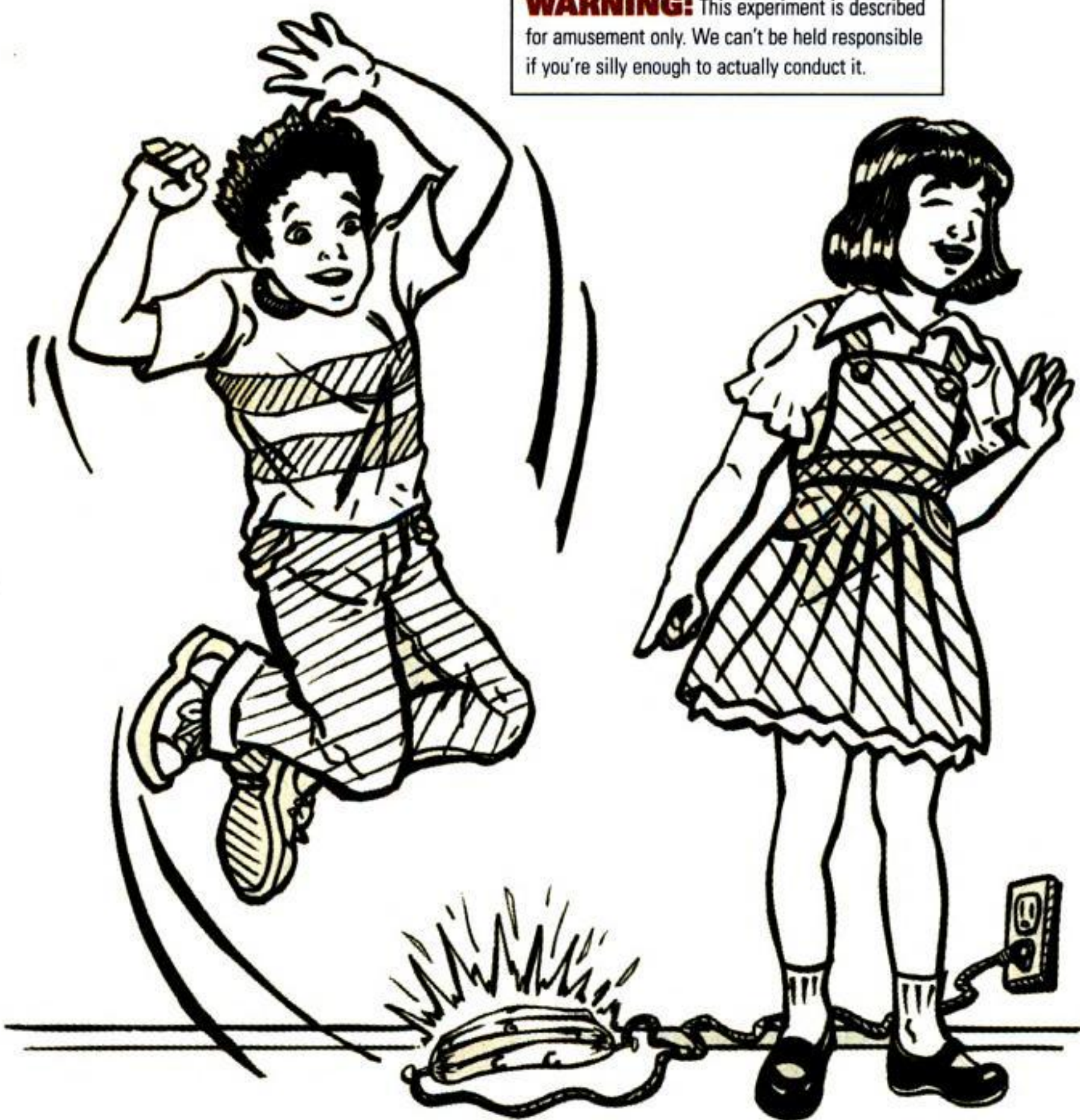
- A. Root mean squared
- B. Root minus seven
- C. Radius movement sustained
- D. Rotating movement subtraction

24 A bootable hard drive partition is called:

- A. Active
- B. Master
- C. Secondary
- D. Logical

The Electric Pickle!

Make sure your homeowners insurance is paid up before amazing your friends with this trick. Visit your favorite deli and buy one of those freakishly large dill pickles. Grab two nails and an extension cord from the garage. Cut off the female end of the cord, and then strip off about two inches of the insulation. Wrap each of the exposed wires around one of the nails, and then insert one nail into each end of the pickle. Put the pickle on a ceramic plate (or any other nonconductive surface), plug in the extension cord, and watch the pickle light up with an eerie glow! When the pickle begins to smell—and it won't take long—quickly pull the plug.



25 Microsoft "hotfixes" (small updates to its Windows OS) are also called:

- A. Quick fix engineering files
- B. Rapid response update
- C. Windows security update
- D. Secure OS initiative update

26 The current 48-bit logical block addressing (LBA) scheme for addressing hard drives will be usable until hard drives reach this capacity:

- A. 4.5 terabytes
- B. 1300 terabytes
- C. 144 petabytes
- D. 232 exabytes

27 What is the AUDIO_TS folder on a DVD intended for?

- A. Optional, audio-only AC3 soundtracks
- B. High-definition DVD-Audio
- C. The DVD's audio files
- D. Tells your DVD player the disc was mastered using 24-bit audio

Worth 2 points!

28 Which CPU has the highest clock speed?

- A. Intel Pentium 4 520J
- B. AMD Athlon 64 FX-55
- C. Celeron 345J
- D. Athlon XP 3200+

29 A CPU's math co-processor is also known as the:

- A. L2 cache
- B. L1 cache
- C. Floating-point unit
- D. Register

30 The word "giga" is a multiplier indicating *n* of some unit. What is *n*?

- A. A hundred
- B. A thousand
- C. A million
- D. A billion

31 One advantage of Serial ATA hard drives over parallel ATA hard drives is:

- A. Thicker, more secure cables
- B. No jumper selection
- C. Quieter operation
- D. Higher capacities

32 An individual stick of Rambus memory is also called a:

- A. DIMM
- B. RIMM
- C. MIMM
- D. SDRAM

33 An interface that transfers data along a single path, one bit at a time, is known as:

- A. Sequential
- B. Serial
- C. Parallel
- D. PCI

34 Dual Link technology makes it possible to:

- A. Connect two DVI monitors to one PC
- B. Increase the bandwidth ceiling of DVI
- C. Double the speed of a monitor's response time
- D. None of the above

35 The Radeon X850 XT Platinum will work with all but one of the following monitors:

- A. Dell's 2001FP
- B. Apple's 30-inch Cinema Display
- C. A DoubleSight LCD
- D. HP's ep7110 DLP Projector

36 A 30-inch LCD has what aspect ratio?

- A. 11:6
- B. 2.35:1
- C. 16:9
- D. 2.55:1

37 Which display technology has the red, green, and blue sub-pixels literally sprayed onto a substrate using inkjet printing technology?

- A. Plasma
- B. DLP
- C. LCOS
- D. OLED

38 Intel and AMD's "dual core" processors will feature:

- A. Two CPU cores
- B. Two DDR2 memory controller cores
- C. Two cores of L3 cache
- D. A single processor core split in two for power-saving benefits

ANSWERS (no peeking!):

1:a; 2:c; 3:a; 4:c; 5:a; 6:a; 7:d; 8:a; 9:b; 10:c; 11:d; 12: 1:d, 2:b, 3:c, 4:a; 13:d; 14:d; 15:c; 16:c; 17:d; 18:b; 19:b; 20:c; 21:d; 22:b; 23:a; 24:a; 25:a; 26:c; 27:b; 28:c; 29:c; 30:d; 31:b; 32:b; 33:b; 34:b; 35:b; 36:c; 37:d; 38:a

Your Score: _____

GEEK QUIZ 2005



39 What is new about the LGA775 processors?

- A. They use a flip-chip design that has the processor facing away from the motherboard
- B. They no longer feature pins on the CPU
- C. They eliminate the need for thermal paste
- D. They have an integrated heat spreader

40 What criteria is not factored into Intel's new processor number nomenclature?

- A. Architecture
- B. iCOMP performance
- C. Cache
- D. Other Intel technologies

41 Which display technology has the potential to suffer from a "rainbow effect"?

- A. LCD
- B. CRT
- C. Plasma
- D. DLP

Worth 2 points!

42 Which AMD processor in this list was the first to use strained silicon?

- A. Athlon 64 FX-53
- B. Athlon 64 FX-55
- C. Athlon 64 4000+
- D. Athlon MP 3000+

43 "Pits" and "lands" are found on:

- A. Optical discs
- B. Hard drive platters
- C. Circuit boards
- D. Silicon platters before UV exposure

44 Which new technology is not a feature of Intel's 925XE?

- A. DDR2
- B. SATA 3G
- C. PCI Express
- D. 1066MHz front-side bus

45 The nForce4 does not feature:

- A. Gigabit Ethernet
- B. SATA RAID
- C. HD Audio
- D. A hardware firewall

46 Changing the lane-configuration card on an nForce4-SLI motherboard to "SLI" sets the two x16 PCI-E slots to:

- A. x8 and x8
- B. x16 and x16
- C. x4 and x16
- D. x4 and x4

47 Which is not an AMD CPU code-name?

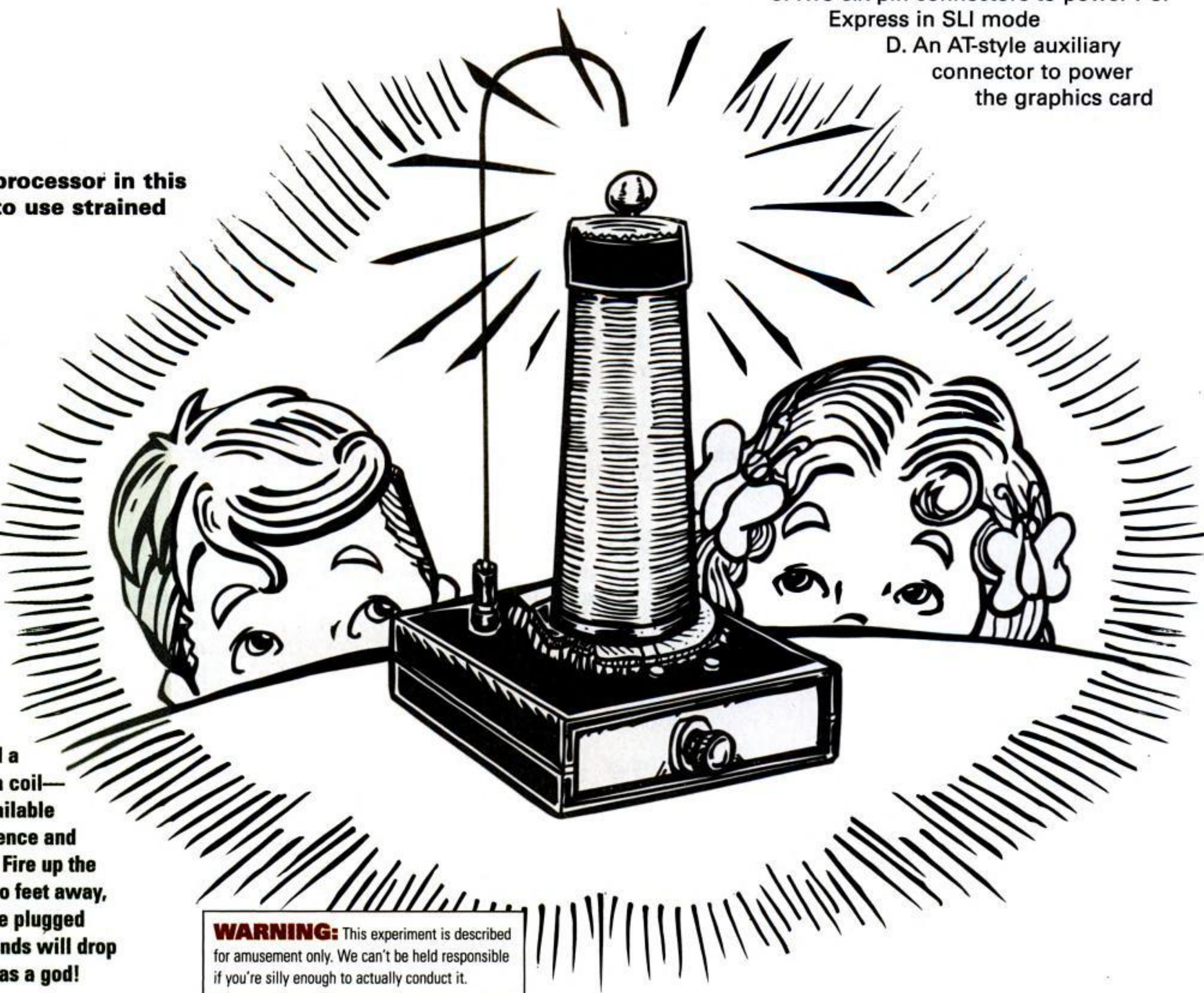
- A. San Diego
- B. Mustang
- C. Palermo
- D. Palo Alto

48 An ATX 12V 2.0 spec power supply requires:

- A. A 24-pin main power connector
- B. A 20-pin main power connector
- C. Two six-pin connectors to power PCI Express in SLI mode
- D. An AT-style auxiliary connector to power the graphics card

The Mysterious Tesla Coil!

A tesla coil radiates electricity without wires. Unbelievable, you say? Try this experiment: You'll need a fluorescent tube and a tesla coil—the one pictured here is available for \$200 from American Science and Surplus (www.sciplus.com). Fire up the coil, hold the tube about two feet away, and it will glow as if it were plugged into a light fixture. Your friends will drop to their knees to honor you as a god!



WARNING: This experiment is described for amusement only. We can't be held responsible if you're silly enough to actually conduct it.

ANSWERS (no peeking!):

39:b; 40:b; 41:d; 42:b; 43:a; 44:b; 45:c; 46:a; 47:d; 48:a

Your Score:

SAGER
THE PORTABLE POWER PEOPLE

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GEEK QUIZ 2005



PC GAMES

49 How often should you degauss an LCD monitor?

- A. Once a month
- B. Only when it needs it
- C. Never
- D. LCDs degauss themselves

50 What CPU does not support Microsoft's No eXecute anti-buffer overflow feature?

- A. Transmeta Efficeon TM8800
- B. Intel Mobile Pentium 4 518
- C. Intel Pentium 4 540J
- D. AMD Athlon 64 3000+

51 Creative has not purchased the intellectual property of:

- A. Aureal
- B. Sensaura
- C. Qsound
- D. 3DLabs

52 Which wireless standard is pretty much dead?

- A. 802.11a
- B. HomeRF
- C. 802.11b
- D. WiMax

53 Who created the Mini-ITX formfactor?

- A. Intel
- B. nVidia
- C. Sun
- D. VIA

54 Intel didn't introduce a 4GHz Pentium 4 because:

- A. Chinese OEMs said the number 4 was bad luck
- B. The company chose to concentrate on making dual-core processors
- C. Most people were rounding up 3.8GHz procs anyway
- D. Market research indicated consumers would be confused by "4GHz" and "Pentium 4"

55 VoIP stands for:

- A. Velocity of Internet phones
- B. Verizon ownz International Phonics
- C. Very open Internet protocol
- D. Voice over Internet protocol

56 Which is not a Wi-Fi certified spec?

- A. 802.11a
- B. 802.11b
- C. 802.11g
- D. 802.11n

Worth 2 points!

57 If a hard drive spins at 10,000rpm, how many times does its outer edge rotate every second?

- A. 66.7
- B. 166.7
- C. 133.3
- D. 33.3

58 Which is the correct chronological order of releases:

- A. Mozilla 1.0, Phoenix, Firefox, Firebird
- B. Phoenix, Mozilla 1.0, Firebird, Firefox
- C. Mozilla 1.0, Phoenix, Firebird, Firefox
- D. Phoenix, Mozilla, Firefox, Firebird

59 What did Gordon Freeman use to make nice with the Ant Lions in *Half-Life 2*?

- A. Bacon bits
- B. Bugbait
- C. Persimmons
- D. Accent™

60 What was the name of the scientist responsible for the unfortunate events in *Doom 3*?

- A. Malcolm Betruger
- B. Elliot Swan
- C. Jack Campbell
- D. John Ritter

61 Which subtitle was associated with a game sequel?

- A. *United Offensive*
- B. *Battle out of Hell*
- C. *Warrior Within*
- D. *Escape from Butcher Bay*

62 Which game's engine was used to recreate historical battles on a BBC television show?

- A. *Call of Duty*
- B. *Alexander*
- C. *Rome: Total War*
- D. *The Sims 2*

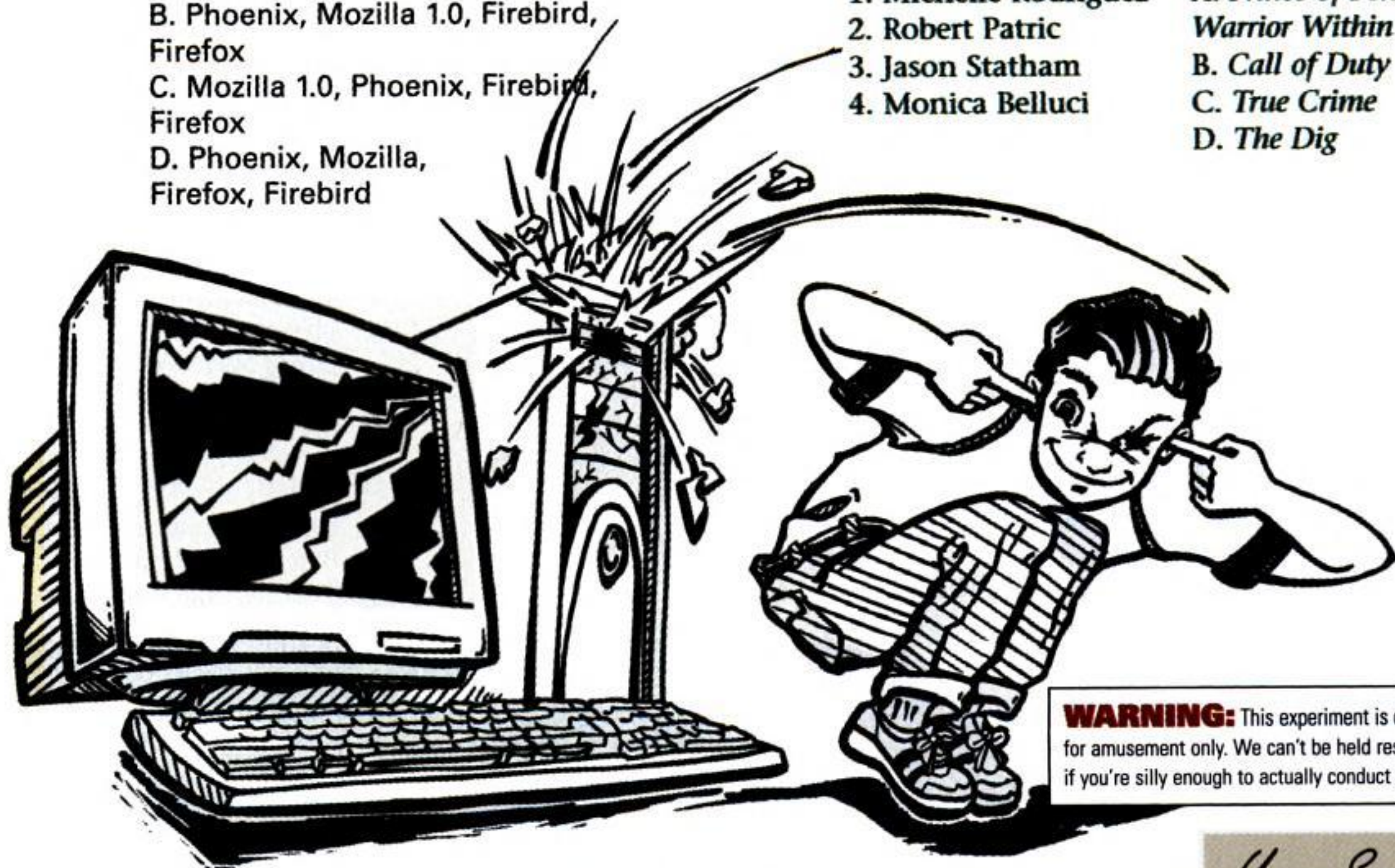
Worth 2 points!

63 Match the voiceover actor with the game:

- | | |
|-----------------------|--|
| 1. Michelle Rodriguez | A. <i>Prince of Persia: Warrior Within</i> |
| 2. Robert Patric | B. <i>Call of Duty</i> |
| 3. Jason Statham | C. <i>True Crime</i> |
| 4. Monica Bellucci | D. <i>The Dig</i> |

Get a Bang out of Your PC!

PCs aren't just massively powerful computing devices anymore—they're also noisemakers! Take a CD you no longer value and place it on the sidewalk or some other hard surface. Pound the disc with a few sharp, quick strikes of a hammer until the surface of the disc cracks. Place the disc in a CD-ROM drive that you have equally little regard for and get the hell out of the way. The disc will spin up, and if you're lucky, you'll hear a sound like a gunshot as razor-sharp disc and bezel shrapnel spray all over the room!



WARNING: This experiment is described for amusement only. We can't be held responsible if you're silly enough to actually conduct it.

ANSWERS (no peeking!):

49:c; 50:b; 51:c; 52:b; 53:d; 54:b; 55:d; 56:d; 57:b; 58:c; 59:b; 60:a; 61:c; 62:c; 63: 1:c, 2:d, 3:b, 4:a

Your Score:

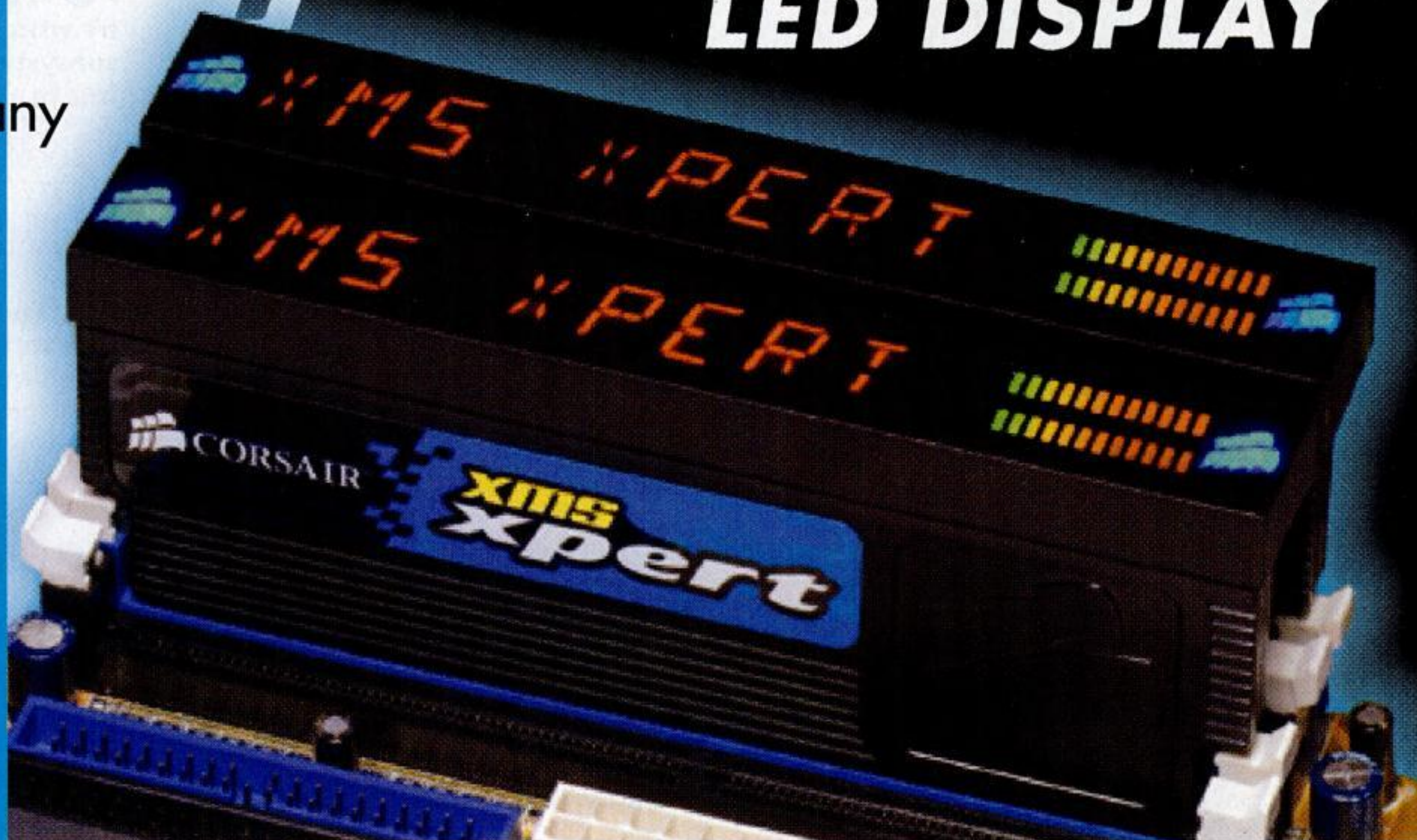
XMS xpert

PERFORMANCE MEMORY

WITH PROGRAMMABLE

LED DISPLAY

Compatible with any
PC3200
System



XPert FEATURES

- Displays real-time memory parameters on LED display
 - Voltage:
shows measured-on-module voltage
 - Temperature:
displays temperature under the heatsink
 - Frequency:
integrated crystal measures actual memory frequency
- User-programmable, scrolling marquee
- CD with Corsair Memory Dashboard™ software for Windows™ included

Corsair XMS: The Industry's Most Awarded Memory

Now introducing the world's first memory that monitors module parametric data...in real-time! These DDR modules constantly measure and display their current frequency, voltage and temperature. What's more, you can program our own personal message that will scroll across the display. You've got up to 69 characters, so unleash your creativity. But these modules are about more than good looks. As part of Corsair's legendary XMS family, they deliver blistering fast performance.



LEDs display real-time frequency, temperature and voltage, plus a scrolling programmable message of your choice.



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GEEK QUIZ 2005

PC JARGON



64 Software licensed under the GPL:

- A. Has to be made available free of charge to everyone
- B. Has to include freely available source code
- C. Must come with a free beer
- D. Both A and B

65 These types of bearings used to be found only in server-class hard drives, but are now found in high-performance, consumer-level drives:

- A. Ball bearing
- B. Fluid bearing
- C. Magneto bearing
- D. Laser bearing

66 The most common scripting languages used on the web are:

- A. PHP and Perl
- B. Java and Javascript
- C. Flash and Java
- D. Apache and IIS

67 The apt-get program in Debian Linux is responsible for:

- A. Keeping hard drives properly configured
- B. Connecting and disconnecting USB drives
- C. Managing applications installed on a system
- D. All network connections in and out of the machine

68 Biometric devices are:

- A. Used in medical applications
- B. Used by botanists and ecologists
- C. Used to verify your identity
- D. Potentially explosive

69 The big improvement offered by the Pixel Shader 3.0 spec is:

- A. Increased performance on nVidia cards
- B. Full fp32 support through the entire pipeline
- C. A and B
- D. None of the above

70 Windows Longhorn's new 3D user interface is called:

- A. Avalon 3D
- B. Artifice
- C. Asmodeus
- D. Armignon

71 Luna is to Aqua as the Taskbar is to the:

- A. Icon bar
- B. iBar
- C. Dock
- D. Finder

72 Which company has never released a dual-GPU solution?

- A. ATI
- B. nVidia
- C. 3dfx
- D. Matrox

73 A x16 PCI Express slot delivers peak bandwidth of:

- A. 4GB/s upstream and 4GB/s downstream
- B. 4Gb/s upstream
- C. 2GB/s upstream and 4GB/s downstream
- D. 400MB/s upstream and downstream

74 With two GeForce 6800s in SLI mode, each card:

- A. Shares its memory to effectively double the amount of video RAM
- B. Keeps separate video memory pools
- C. Renders exactly half of the screen
- D. Consumes more electricity than it normally would

75 What does the "VST" in "VST plugins" stand for?

- A. Virtual studio technology
- B. Variable/static transmission
- C. Vandergraf/Stelt transposition
- D. Virtual signal transposition

76 The maximum capacity of a double-layer Blu-ray disc is:

- A. 28GB
- B. 38GB
- C. 50GB
- D. 76GB

77 In *Matrix Reloaded*, Trinity used a program called nmap. What does it do?

- A. "Spoof" network authentication
- B. Scan networks
- C. Reroute IP packets
- D. Locate and disable network authentication requirements

78 The acronym for the process by which a computer tests its subsystems immediately after booting is:

- A. POST
- B. BOOT
- C. TEST
- D. CHECK

79 The acronym AHCI stands for this technology, patented by Intel:

- A. Advanced host controller interface
- B. Adapter to host cache interpreter
- C. Advanced hub chipset interface
- D. Audio hub controller interface

80 A MAC address can be found on:

- A. The new G5
- B. Every Macintosh prior to the G5
- C. A NIC
- D. A web page

81 A DB-15 input is also known as:

- A. VGA
- B. DVI
- C. Component
- D. Composite

82 HD Audio is:

- A. Real-time hardware Dolby Digital encoding
- B. An Intel spec for eight-channel, 24-bit audio on the PC
- C. Aureal Wavetracing audio, featuring high-definition head transfer functions
- D. An audio specification for next-generation HDTV sets

83 What is ZigBee?

- A. A wireless standard
- B. A peer-to-peer networking protocol
- C. A personal-area-network video-streaming protocol
- D. An open-source lossless audio codec

84 What's the code-name for Palm OS 6?

- A. Cobalt
- B. Mica
- C. Garnet
- D. Obsidian

85 Who created the BitTorrent file-sharing protocol?

- A. Steven Millhauser
- B. Amrith Rebbapragada
- C. Steven Chu
- D. Bram Cohen

86 Which technology could make traditional factor-based encryption obsolete?

- A. Quantum computing
- B. Divisional operators
- C. Hardware Gödel multipliers
- D. Both A and B

87 Wobble grooves are found in:

- A. Floppy disks
- B. Hard drives
- C. Tape drives
- D. Recordable DVDs

88 Who created an algorithm for ultra-secure hard drive data erasure?

- A. Perry Schneier
- B. Peter Gutmann
- C. Zuzana Licko
- D. Rudy Vanderlans

89 Baud is a measure of:

- A. Bits per second
- B. Kilobits per second
- C. Megabits per second
- D. Authentication rate

90 The last parallel ATA specification released before the switch to Serial ATA was named:

- A. ATA-8
- B. ATA-7
- C. ATA-6
- D. ATA-5

91 The technology behind RAID for hard drives was first developed at:

- A. The University of California at Berkeley
- B. IBM
- C. MIT
- D. Xerox PARS

92 Which does not belong?

- A. H.264
- B. VCD
- C. Nero Digital
- D. Divx

93 RAW is a format found in what devices?

- A. Digital cameras
- B. Portable video players
- C. MP3 players that support lossless codecs
- D. Camera phones

94 CAS stands for:

- A. Cyclical adaptive services
- B. Column addressable stem
- C. Cycle-adaptive stream
- D. Column address strobe

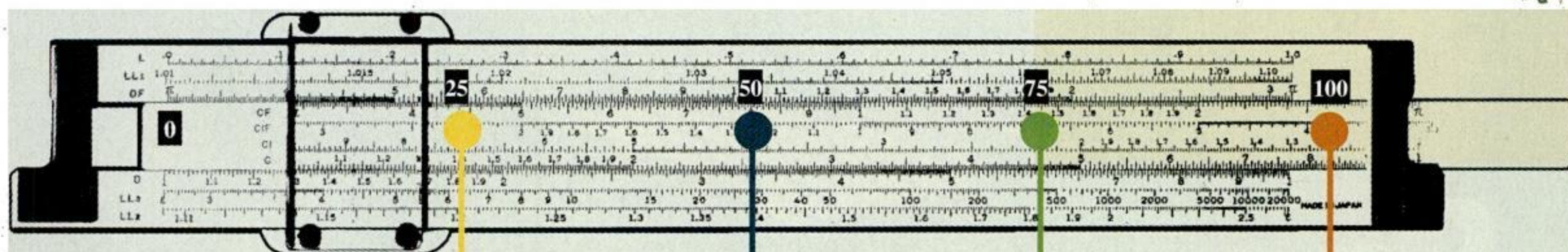
95 The standard cable used in Ethernet-based networking is called:

- A. RJ-45
- B. RJ-14
- C. RC-11
- D. R2-D2 ■



The Geek-O-Meter!

Remember, if you're not a winner, you're a *loser*. Which one are you? Compare your score to the Geek-o-Meter and find out what your future holds!



0-25 CORRECT

All kids love eating burgers, fries, and frosted malts. Now's your chance to find out how much fun it can be to make them! Your score indicates you're on the fast track to a primo job in the food-service industry. You'll wear a stiff polyester outfit with a matching cap, take orders from a hormonally challenged nerd, and enjoy employee discounts of up to 20 percent on one meal—all seven days of your work week!

26-50 CORRECT

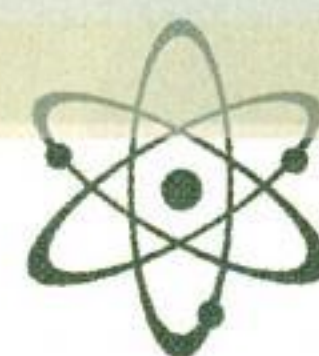
Have you ever dreamed of being an astronaut and exploring the frontiers of space? Well, we've got great news for you! Your score qualifies you to be an office assistant at a firm that delivers janitorial supplies to companies that manufacture components for spacecraft that carry *other* people into the frontiers of space. Not even your high-school guidance counselor thought you'd come *this* close to realizing your dream.

51-75 CORRECT

If you scored in this range, you have tremendous potential. You're not the smartest kid in the world; in fact, there are probably lots of malnourished kids in third-world countries who are smarter than you, and they'll undoubtedly wind up getting most of the accolades and promotions you thought *you* deserved. But with a little cunning and some light backstabbing, you just might be able to claw your way to the top in the computer biz.

76-100 CORRECT

Were you cheating? Cheaters end up using drugs and dying of syphilis. We're not accusing you—we just thought you should know the consequences. If you *weren't* cheating, we recommend you drink lots of milk. Dairy farmers add vitamin D to milk, which your body would otherwise get from sunlight—something you'll never see working under the fluorescent light in sub-basement 4 (Section A22b) of the Los Alamos National Labs. *Brav-o!*

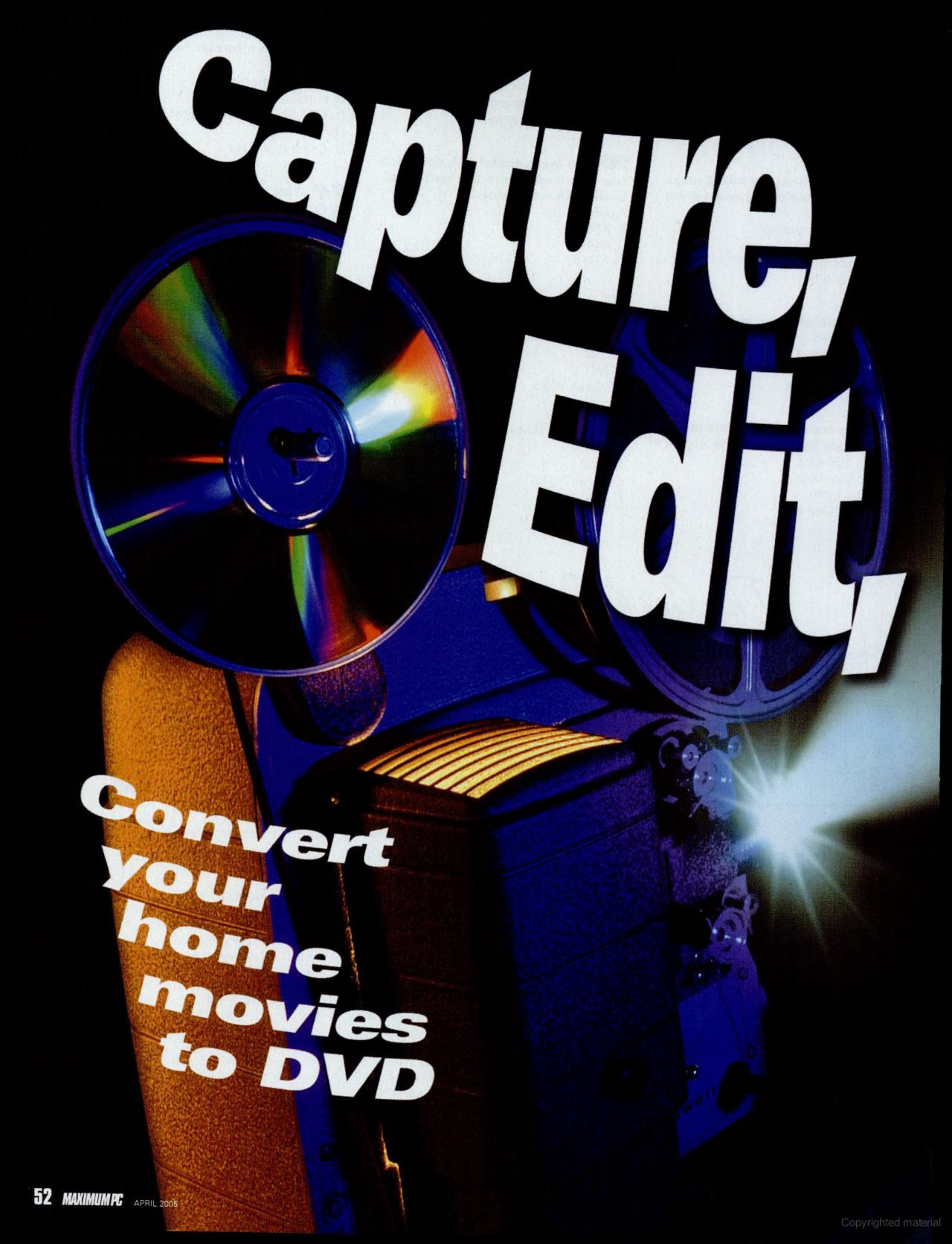


ANSWERS (no peeking!):

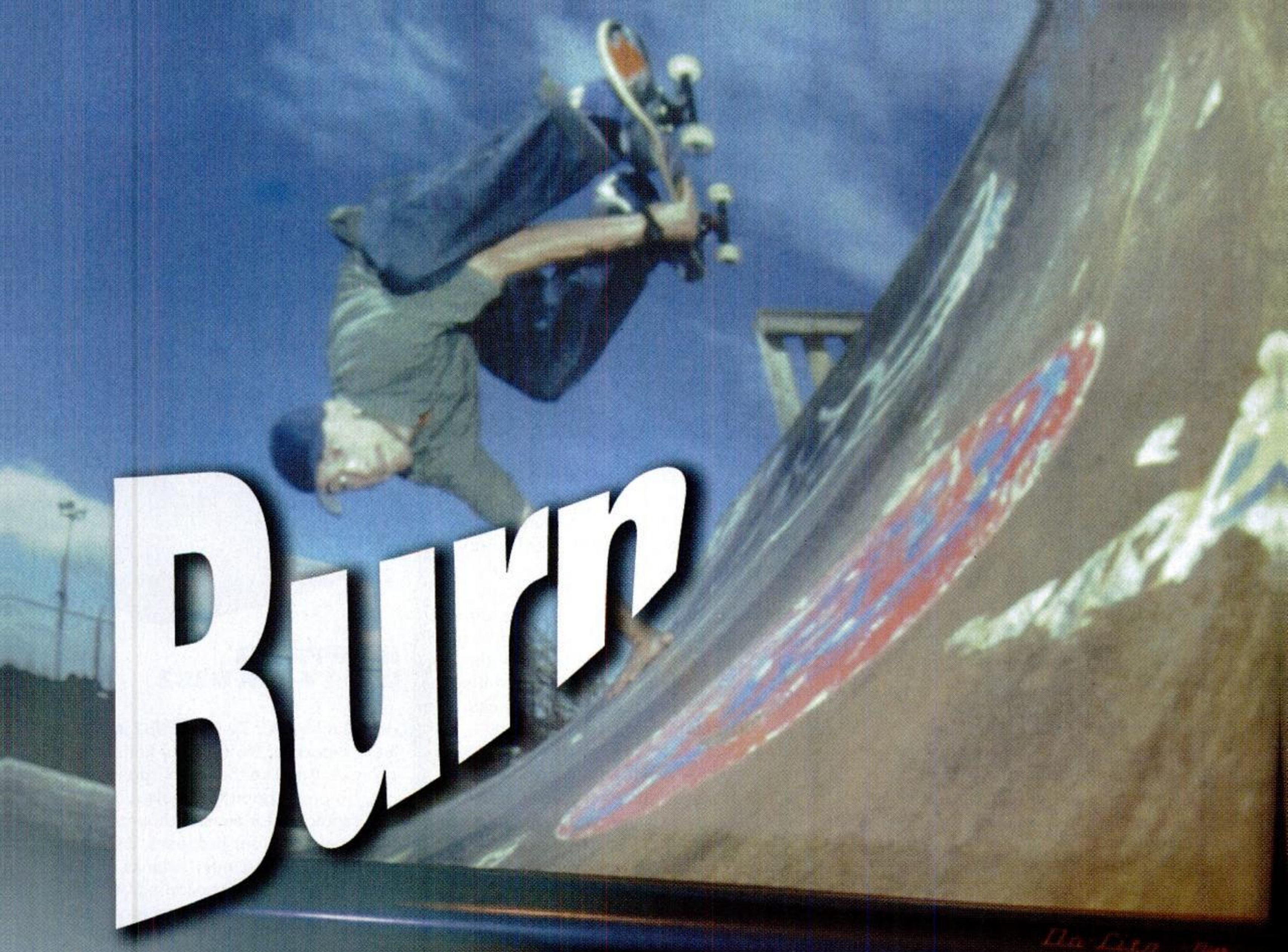
84:b; 85:b; 86:a; 87:c; 88:c; 89:c; 90:a; 91:c; 92:d; 93:a; 94:b; 95:a; 96:c; 97:b; 98:a; 99:a; 80:c; 81:a; 82:b; 83:a; 84:a; 85:d; 86:a; 87:d; 88:b; 89:a; 90:b; 91:a; 92:b; 93:a; 94:d; 95:a

Your Final Score:

Capture, Edit,



**Convert
your
home
movies
to DVD**



Burn

BY TAE K. KIM

How many of your precious memories are locked up in aging analog videotape? Your college graduation? Your wedding and honeymoon? Your baby's first steps? That time your buddy did a face-plant on the half pipe. It's time you brought those old home movies into the digital domain, before the VCR goes the way of the floppy drive.

Inexpensive camcorders have been around since the early 1980s, but raw footage is rarely worth watching more than once. The key to producing enjoyable home movies lies in editing: 86 the dull moments, do some voiceover narration to add context, and lay down titles and credits. And since you'll burn the whole thing to DVD, create professional menus that will help viewers find exactly what they're looking for when they drop the disc in a player.

Pulling off this feat on your PC requires a combination of hardware and software—unless your PC came from the factory with a videocard already outfitted for

analog video-capture duties. We tested four of the most common packages—from Pinnacle, ADSTech, Adaptec, and Hauppauge—capable of digitizing analog video and transferring it to a computer's hard drive over a USB cable. (We chose this technology because it's more ubiquitous than FireWire, there's no difference in image quality, and there's no substantial difference in speed. For the record, FireWire *is* slightly faster.) We also evaluated the video-editing suites that come bundled with the video-capture boxes—and discovered we'd need to mix and match hardware and software to create the ultimate capture-edit-burn solution.

Once you've digested our hands-on reviews, move on to our step-by-step guide to digitizing, editing, and burning your own movies to DVD using Nero's *NeroVision Express 3*. When you're done, you'll not only have preserved your video memories, you'll have created movies that friends and family will enjoy for generations.

Pick the Perfect Hardware

Before you can save your video, you need a device capable of converting your analog video to a tasty digital stream. That's where these four hardware packages come in.



ADAPTEC VIDEOH! DVD

It might be short on frills, but Adaptec's VideOh! DVD is a solid video-capture device. It's also one of the three devices in our roundup to provide a built-in hardware MPEG-2 encoder (Hauppauge's WinTV-PVR and ADS Tech's DVDXpress being the others). The presence of the encoder led to satisfactory, but not outstanding, results in our vid-cap tests. We were less impressed with the bundled software: A limited version of Sonic's *MyDVD* is a decent DVD-authoring solution, but it can't match the functionality of a dedicated video-editing suite. We were also dismayed by the absence of a printed manual for the software.

It's hard to knock a hardware product for having weak bundled software, especially when the hardware performs so well; as it stands, however, we recommend the Adaptec VideOh! DVD only if you already own a stand-alone video-editing program (or don't intend to edit your footage). Anyone in the market for a complete, all-in-one solution should look elsewhere.

MAXIMUMPC VERDICT

8

+ OH MY!

Solid performance, and hardware MPEG-2 encoding delivers great performance and quality.

- OH NO!

Doesn't include a video-editing program.

\$100, www.adaptec.com

ADS TECH DVDXPRESS

The ADS Tech DVDXpress is as simple and straightforward as its name suggests. It's a no-frills product—similar to the Adaptec VideOh! and the Pinnacle DVC-90—but it gets the job done. The small, unobtrusive unit includes inputs for analog audio and video (composite and S-Video); unlike the Pinnacle device, it outputs these signals only through its USB port.

All in all, we were satisfied with the video we captured using the DVDXpress. But while the device comes with a plethora of software—including *Capture Wizard 3.0* and both Ulead's *MovieFactory 3SE* authoring suite and its *VideoStudio 7 SE* video-editing package—they aren't the latest versions. As with Adaptec's package, you'll need to augment the DVDXpress bundle with additional software purchases. In this respect, Adaptec's VideOh! has an edge because it's \$30 cheaper. DVDXpress will appeal to novice users looking for a no-hassle video-capture solution, but it's by no means the best product in this category.

MAXIMUMPC VERDICT

7

+ AD&D

Good performance and easy setup.

- ADD

Outdated software.

\$130, www.adstech.com



HAUPPAUGE WIN TV-PVR USB2

Hauppauge's WinTV-PVR USB2 is a feature-packed, Swiss Army knife of a product. And like that all-purpose gadget, it's pretty good for one application and mediocre for several others. Most importantly for our purposes, it's quite good at capturing video, thanks to hardware-based MPEG-2 encoding. As the "PVR" in its name suggests, it can also function as a Tivo-like personal video recorder, although its user interface isn't nearly as polished as Tivo's.

We were disappointed in Hauppauge's choice of software bundle—Ulead's *DVD MovieFactory 3*—because it's not a full-fledged video-editing suite. And the skimpy quick-start user manual did little to help us learn how to get the most of the product. These issues aside, we were impressed with the WinTV-PVR's performance in our video-capture tests, and its PVR capabilities will render it useful long after your vacation videos have been archived onto your hard drive.

MAXIMUMPC VERDICT

8

+ HASSELBACH

Hardware MPEG-2 encoding, and PVR capabilities.

- HASSELHOFF

No dedicated video-editing suite, and inadequate documentation.

\$150, www.hauppauge.com

PINNACLE DAZZLE DVC90

Pinnacle's Dazzle DVC90 is aimed squarely at novice users. The DVC90—the least expensive solution in our roundup—is a straightforward, no-frills product that more than makes up for its plain-Jane trappings by performing its duties without a lot of hassle. The DVC90 doesn't even require an external power source: Because it doesn't have any power-hungry encoding hardware onboard, it draws juice directly from the host PC's USB port.

The DVC90 manages to deliver adequate performance despite this limitation. Pinnacle bundles the device with *Studio QuickStart*, a "lite" version of the company's hallmark *Pinnacle Studio* software. Although this doesn't offer nearly as many features as *Pinnacle Studio Plus* or even the more basic *Pinnacle Studio*, it's enough to give any budding Kubrick a crack at making a home-video masterpiece.

MAXIMUMPC VERDICT

7

+ SUMMIT

Easy setup, decent performance, and a great price.

- BASE CAMP

No hardware encoder, and not as versatile as other options.

\$90, www.pinnaclesys.com



PINNACLE STUDIO MOVIEBOX DELUXE

Pinnacle Systems bundles one of the best consumer-oriented video-editing packages around—*Pinnacle Studio Plus 9*—with the MovieBox Deluxe, but we were sorely disappointed with the video-capture device itself. Video captured through the MovieBox's composite video port exhibited severe jitter, as if our source device had a serious tracking problem. This had us baffled, because none of the other devices we tested had a problem digitizing from this same source. After experiencing the same problem using several different cables and VHS tapes, we concluded that the MovieBox is just highly sensitive to the slightest instability in composite input source. (Our conclusion was reinforced by the fact that we were able to capture composite video from a late-model DV camcorder without incident.)

With this in mind, it's difficult to recommend the MovieBox Deluxe for capturing analog video from the composite outputs of older video devices.

Fortunately, *Pinnacle Studio Plus* is available as a stand-alone package for just \$100.

MAXIMUMPC VERDICT

5

+ BOX LUNCH

Good software bundle, and it's pretty, too!

- BOXCAR

Video-capture sensitivity is worrisome.

\$250, www.pinnaclesys.com



VIDEO-CAPTURE DEVICE FEATURES

PRODUCT	VIDEO INPUT	VIDEO OUTPUT	AUDIO INPUT	AUDIO OUTPUT	PC INTERFACE	HARDWARE MPEG-2 ENCODER?	VIDEO-EDITING SOFTWARE INCLUDED?	PRICE
ADAPTEC VIDEOH! DVD	Composite, S-Video (NTSC or PAL)	None	Stereo (2 RCA)	None	USB 2.0	Yes	No	\$100
DVDXPRESS	Composite, S-Video (NTSC or PAL)	None	Stereo (2 RCA)	None	USB 2.0	Yes	Yes (Ulead VideoStudio 7 SE)	\$130
HAUPPAUGE WIN TV-PVR USB2	Composite, S-Video (NTSC only), TV Antenna	None	Stereo (2 RCA), FM Antenna	None	USB 2.0	Yes	No	\$150
PINNACLE DAZZLE DVC90	Composite, S-Video (NTSC only)	None	Stereo (2 RCA)	None	USB 2.0	No	Yes (Pinnacle Studio QuickStart)	\$90
PINNACLE STUDIO MOVIEBOX DELUXE	Composite, S-Video (NTSC only)	Composite, S-Video (NTSC only)	Stereo (2 RCA)	Stereo (2 RCA)	USB 2.0, FireWire	No	Yes (Pinnacle Studio Plus 9)	\$250

Pick the Perfect Software

Nonlinear video editing ain't easy. With this in mind, we tested the top three video-editing software packages to see which one best balances a rich feature list and ease-of-use.

ADOBE PREMIERE ELEMENTS

Adobe's *Premiere Elements* is an intriguing product: It offers a taste of the company's high-end video-editing software at a price that's accessible to the average consumer. *Premiere Elements* retains some of the power of its professional sibling (including support for up to 99 video tracks and 99 audio tracks), but it's also just about as complex. First-time users will be overwhelmed by the program's editing interface, which is much less intuitive than those found in the other packages here.

Premiere Elements offers you much more control, but you have to suffer through a steep learning curve before you feel comfortable with it. We should also note that the program can capture video *only* from a DV camera.

If you're willing to invest a significant amount of time in order to take advantage of *Premiere Elements'* power, give the program a look. If you want instant gratification, we recommend a less complicated program.



Premiere Elements' interface has a steep learning curve, but it's the most powerful in our roundup.

MAXIMUMPC VERDICT 7
\$100, www.adobe.com



VideoStudio 8's Movie Wizard divides the video-editing process into seven steps.

ULEAD VIDEOSTUDIO 8

If Adobe's *Premiere Elements* is perched at the top of the learning curve, Ulead's *VideoStudio 8* resides near the bottom. We found the program to be incredibly user friendly—it even offers a wizard that holds your hand through the video-capturing, video-editing, and DVD-authoring processes. The wizard isn't perfect—the automatic editing feature is limited, and you should never trust the software to do what you should do for yourself—but parts of it are very helpful. The interface is clean and easy to navigate, and editing chores are a snap to accomplish.

VideoStudio 8 isn't without its faults, however; selecting options using the in-program menus requires an annoying number of mouse clicks, and the program sticks closely to its newbie-friendly roots. If you're looking for a powerful video-editing program, go for *Premiere Elements*. If you're not ready to deal with that program's complexity, consider *Pinnacle Studio Plus 9*. If quick and easy is the order of the day, *VideoStudio 8* fits the bill.

MAXIMUMPC VERDICT 8
\$100, www.ulead.com

PINNACLE STUDIO PLUS 9

Pinnacle develops video-editing systems for the broadcast television market, and the company's always done an excellent job of bringing this technology into its consumer-oriented products. Today, there's a Pinnacle video-editing solution for just about every budget. *Pinnacle Studio Plus 9* is its midrange offering, and it's packed with features that amateur directors will appreciate.

We found the program's user interface to be a breeze to navigate, making it very easy for us to perform basic video editing tasks. We captured our source video, made a few minor edits, added some visual effects, and burned the entire production to DVD with minimal effort.

We were also impressed with the depth of *Pinnacle Studio Plus 9's* video and audio options—including picture-in-picture, chroma key (blue screen), and support for Dolby Digital surround sound. There was one aspect of the program that we found to be truly annoying, however; many features must be purchased and unlocked online before you can use them. This left us with a serious case of the "look-but-don't-touch" blues.



Pinnacle Studio Plus 9's simple interface belies the fact that it's packed with useful features.

MAXIMUMPC VERDICT 8
\$100, www.pinnaclesys.com

Capturing Video

So you've purchased a hardware video converter, installed the necessary software, and dusted off your old home videos. Your next task is to capture that analog video onto your computer's hard drive, converting it to digital video in the process. We'll show you how, using a standard VCR as the source, Adaptec's

VideOh! DVD as the capture device, and *Pinnacle Studio Plus 9* as the capture software. You could just as easily use any other combination of hardware and software (substituting a camcorder for a VCR, for example, if you're capturing from 8mm, Hi8, or VHS-C tape); the steps will be the same.

1) SET UP YOUR VIDEO-CAPTURE HARDWARE

First, set up your video-capture hardware by plugging in the power and USB cables, and then connecting the device to your PC. Load the appropriate drivers from the included installation CD when prompted.



Each of the video-capture units in this roundup uses a USB 2.0 connection, and for good reason: USB 1.0's woefully slow bandwidth isn't suitable for capturing DVD-quality video.

2) CONNECT YOUR SOURCE

Next, plug your source device's video and audio outputs into the video-capture hardware. In this example, we're using a VHS VCR's composite-video output and stereo-audio outputs.



Audio and video cables and inputs are color-coded for easy identification.

3) LAUNCH YOUR VIDEO-CAPTURE SOFTWARE

Launch your video-capture software. (We're using *Pinnacle Studio Plus 9* in this example, but the process will be similar with most programs.) Click the Capture tab to begin the process.

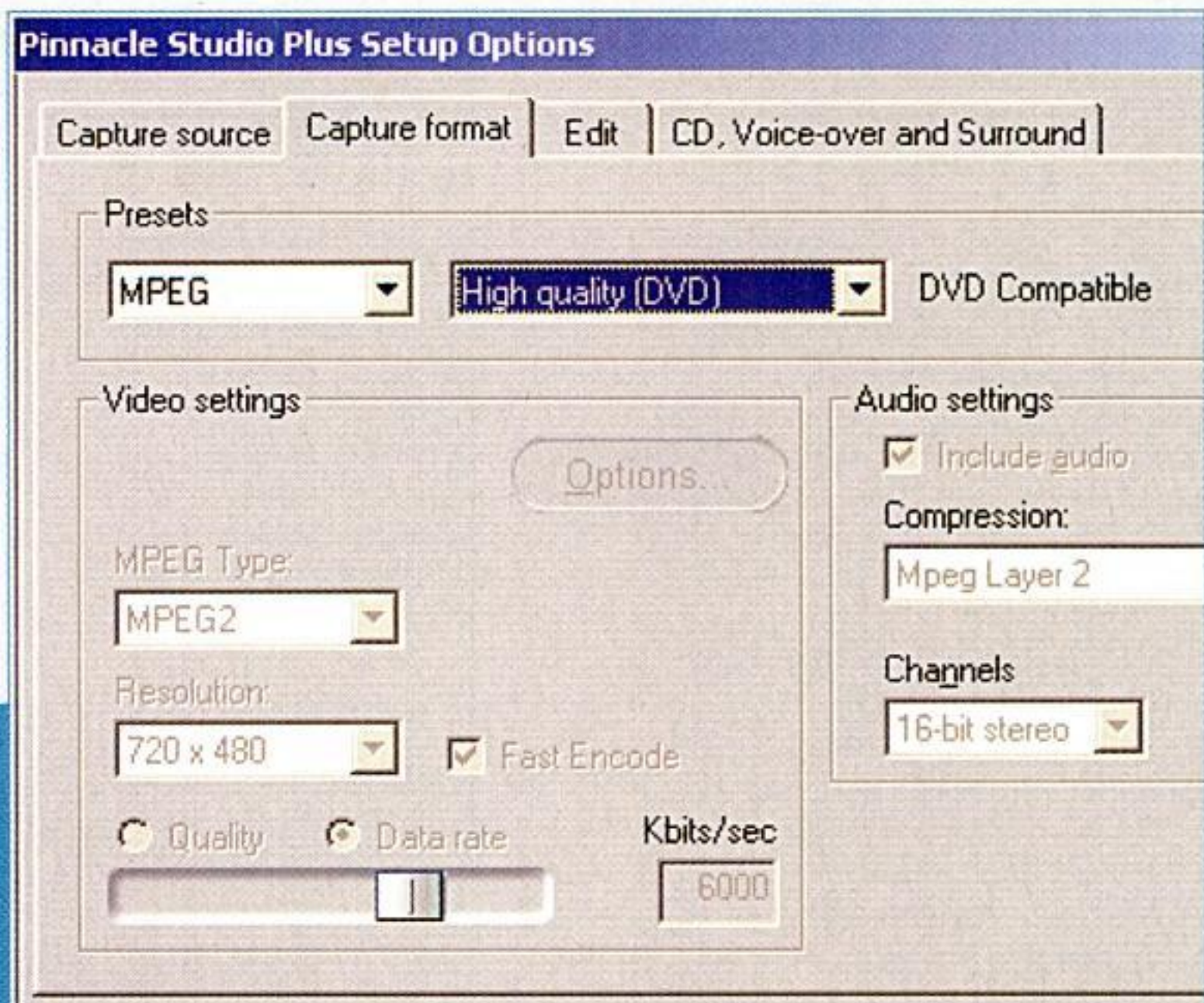


Video capture is the first step in the video-editing process, so consumer-oriented programs such as *Pinnacle Studio Plus 9* make that feature easy to find.

4) CONFIGURE YOUR CAPTURE SOFTWARE

We'll use this menu to set our capture options. Because we'll eventually burn our movie to DVD, we might as well encode the video to MPEG-2 format while we're capturing it to the hard drive. Click the Settings button and then click the Capture Format tab. Change the preset to MPEG video and set the quality setting to High; this will output video in 720x480 resolution.

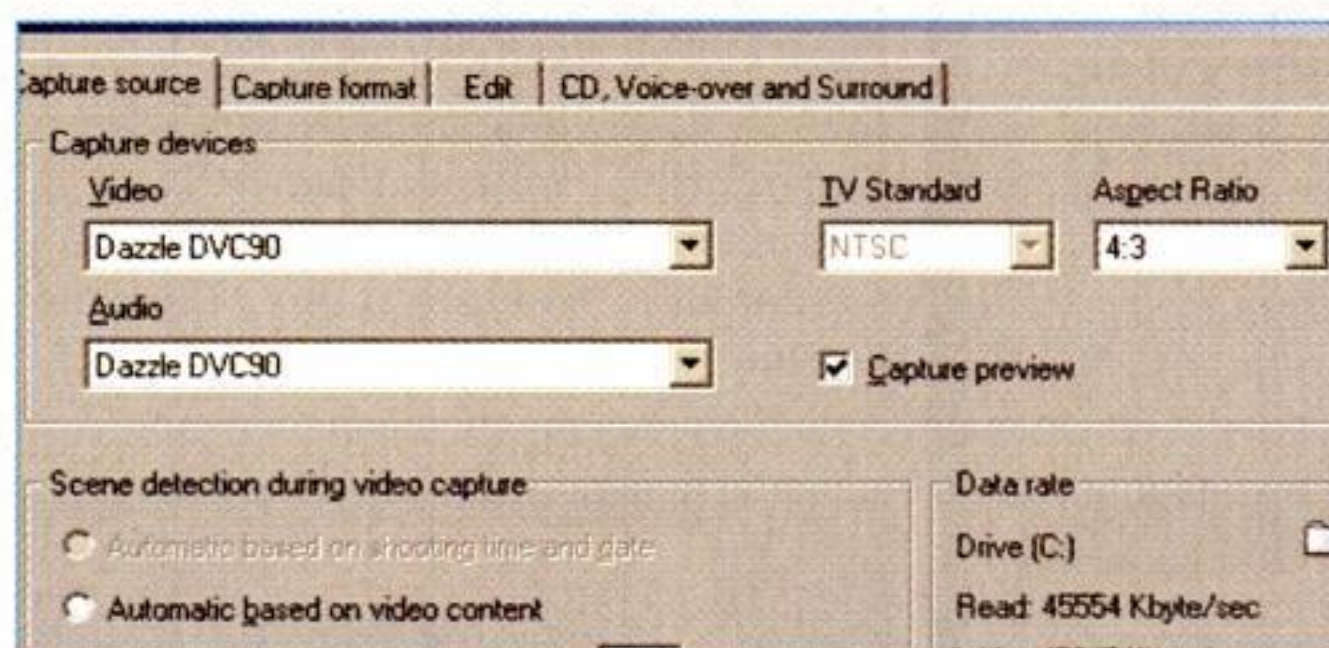
Although it eats up a lot of space on your hard drive, MPEG-2 video at 720x480 resolution delivers the best results for DVD video.





5) MAKE A SCENE

Next, click the Capture Source tab. Make sure your video-capture hardware is listed as both the Video and Audio source. You'll see several options in the box labeled "Scene detection during video capture." These settings will break your captured video into easier-to-manage chunks. We decided against using either of the automatic settings, because we found them to be unreliable; instead, we set up the software to create a scene every five minutes. You might prefer to designate scenes manually by tapping the spacebar. Once you've made your choices, click the OK button to return to the Capture menu.



Breaking your captured footage into intervals will make editing chores a breeze.

6) CHOOSE A DESTINATION

Now you need to tell the software where it should store your captured video. If your system has more than one drive—a good idea if you intend to do a lot of video editing—choose the fastest drive for this task. You can accept or override the default file name. Once you've decided on a location, click OK and return to the main capture menu.

7) CAPTURE YOUR VIDEO

Click the Start Capture button and a dialog box pops up asking for a file name. We've called our example project "Hawaii Vacation." When you're ready, hit the Start Capture button. To guard against missing any footage, allow five seconds to elapse before you hit the Play button on your source device.



Give your captured footage a recognizable and descriptive name so it's easy to identify later.

8) THAT'S ALL, FOLKS!

Capture about five seconds beyond the material you're interested in, and leave the capture program running for a few seconds after you've pressed Stop on your source device; again, the point is to ensure that you're captured everything you want. Blank spots and extraneous material can easily be trimmed away using your editing software. And that's it! Your footage has been captured and converted into high-quality MPEG-2 video. Now you can either load the footage into your video-editing program or burn the file to DVD as-is.

General Editing Tips

■ Remember, the video you capture will be only as good as the source from which it came. If you've been storing your old tapes at the bottom of a dusty closet, or if the tape itself is old and worn, you can expect the captured video to reflect that abuse.

■ "Pack" your videotape by fast-forwarding it all the way through, and then rewinding it before you begin your capture session. This will ensure that the tape moves through the source device's transport mechanism—and over the read heads—smoothly and consistently.

■ If your source device offers S-Video outputs (as do all S-VHS and Hi8 devices), use that instead of the composite output. An S-Video signal carries the video's chrominance (hue and saturation) and luminance (brightness) information separately and will deliver a much higher-quality picture than a composite-video signal.

■ It's easy to get carried away with elaborate titles and gimmicky scene transitions (sweeps, crawls, peels, and the like). Use these effects sparingly—quick fades usually work best—or your

audience will perceive your videos as amateurish and lame.

■ Make sure you have enough space on your hard drive. One hour of video captured in MPEG-2 at 720x480 resolution will consume 3GB of space. If you can swing it, purchase a spacious 7,200rpm drive and dedicate it to video captures.

■ A professional movie maker might shoot 1,000 hours of material in an effort to produce 90 minutes of compelling storytelling. Ruthlessly edit your raw footage

until every second of it is interesting. No one wants to watch two hours of Junior's soccer game, but they'd probably enjoy watching a few good slide tackles and the winning goal.

■ Use your capture software's scene-detection option. If you discover that the automatic settings don't work very well, use the manual feature. Whichever method you choose, it's much easier to edit a series of smaller clips than to slice and dice long stretches of video.

Burning to DVD

All the video-editing and DVD-authoring suites we've discussed are capable of burning your video to a DVD that can be played on a set-top DVD player. Having said that, however, we recommend turning the DVD-authoring chores over to Ahead's *NeroVision Express 3* software (you can download a free trial version from www.nero.com). Burning a DVD can consume an incredible amount of time, and let's face it, blank DVDs aren't cheap. This rock-solid

program has never let us down when it comes to burning DVD movie discs, and we find the user interface to be very intuitive.

Let's take a step-by-step look at how to burn your captured video onto a DVD, complete with menus, using *NeroVision Express 3*. At this point, we're assuming you've already captured your video, using the process we described; made your edits; and saved the footage as a DVD-quality MPEG-2 file.

1) LAUNCH NEROVISION EXPRESS 3

The interface menu on the right side of the screen lists the available options. We're interested in the Make DVD option. Place your cursor over the icon and you'll be offered two sub-options: "DVD-Video" and "DVD-Video (VR)." The latter choice is of interest only if you happen to own a stand-alone, set-top DVD recorder, so click DVD-Video.

2) CHOOSE YOUR CONTENT

The next step is to choose the content you wish to burn to your DVD. Click the option to Add Video Files from the menu on the right side of the screen, and then use the file dialog box to open the MPEG-2 video files you captured and edited earlier. Once you've finished choosing video files, click Next to begin creating your DVD menus.

3) CREATE A DISC MENU

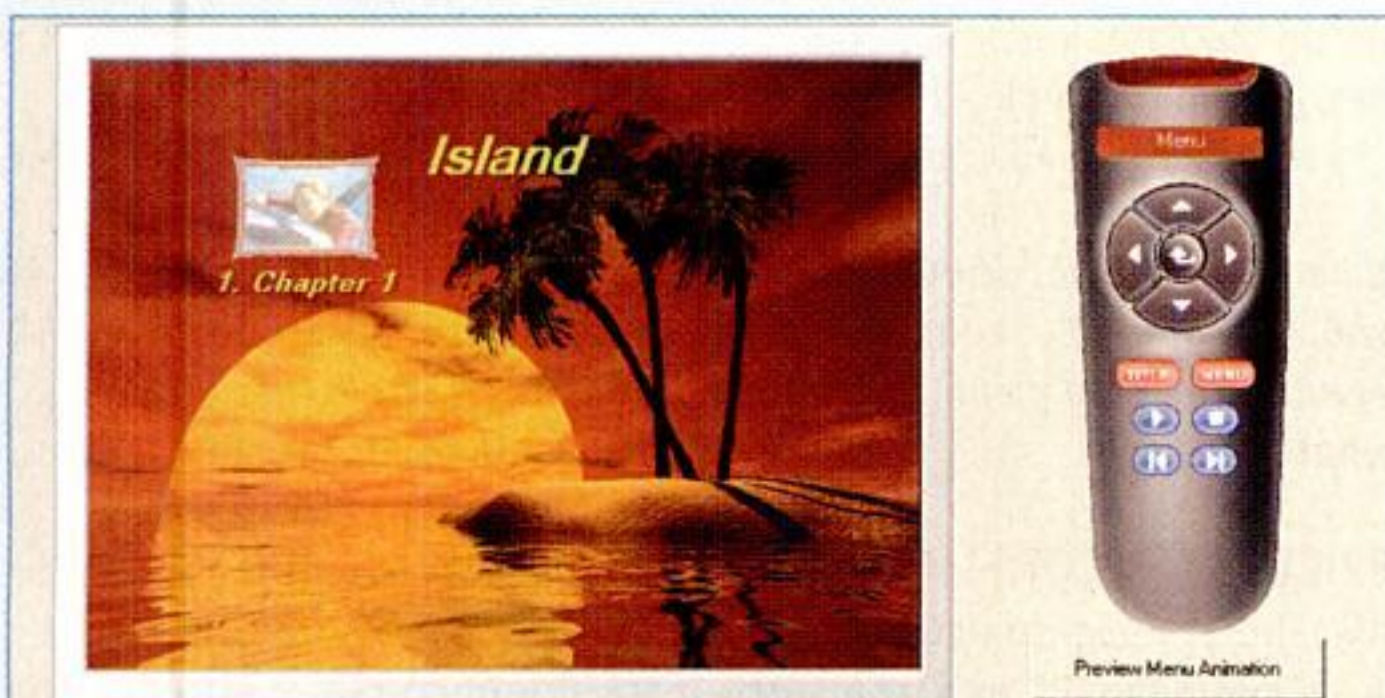
Although it might seem simplistic, *NeroVision Express 3* offers plenty of options for creating attractive menus, which you'll eventually use to navigate your DVD. Click the Edit Menu button to make changes to any of the stock menus, including adding animations and text. You can also download additional menu templates from Ahead's website, or even design your own. Muck around with the menu titles until you're happy with them, and then click Next to preview your new menu before burning the project to disc.



It isn't an absolute necessity, but if you take the time to design an interesting menu, your home movies will exhibit a polished, professional touch that your audience is sure to appreciate.

4) TEST YOUR MENU

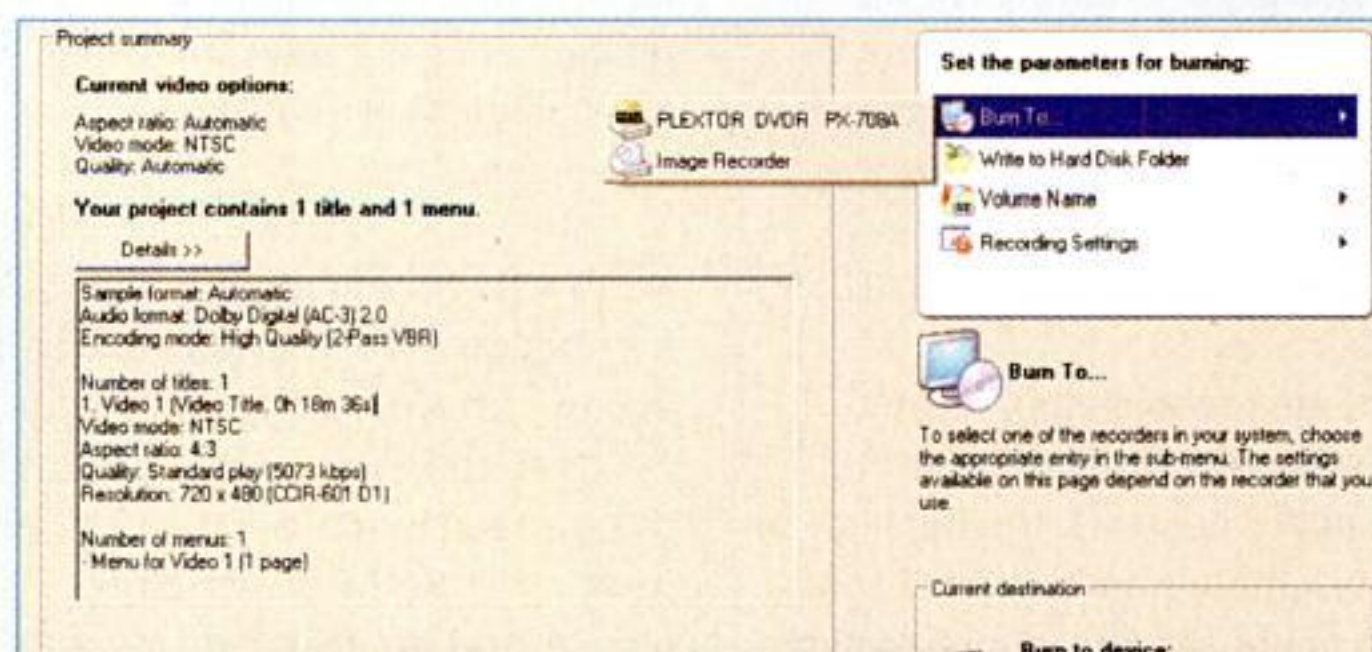
Use the virtual remote control and the Preview Menu Animations button to test your menu. Spend some quality time exploring each menu to make sure it's logical and works exactly the way you envisioned it. Click the Next button when you're satisfied.



Use the Preview screen to test-drive your DVD before committing it to disc. Make sure the menu functions as it should and that it's easy to navigate.

5) BURN YOUR MOVIE TO DVD

You're in the home stretch. The final step is to actually burn your home movie to DVD. Click Volume Name in the right-hand menu and christen your masterpiece with a suitable moniker. Next, click Burn To... and indicate your DVD burner as the destination device. Finally, click the Burn button in the lower-right corner and pat yourself on the back. You're done! ■



Make sure you have a blank DVD loaded in your DVD burner before attempting to burn a disc, or your computer will secretly make fun of you.

Ask the Doctor

Symptom ► Diagnosis ► Cure

INSTANT SCREENSAVING

If the sleep button on my keyboard can make my computer hibernate, can it be configured to run a screensaver? I password-protect my screensaver and would like to be able to lock down my computer as soon as I leave my desk. I've tried using *TweakUI* to redirect the sleep button to the screensaver .exe file, but running that only previews the screensaver, it doesn't password-protect the computer. Is there an executable buried somewhere in the Windows directory that runs the fully functional screensaver, or is there a different way I can easily lock down my computer?

—MATT SIENKO

It's wonderful when the first question is this easy! To lock your computer when you walk away, all you need to do is press Windows key+L. You heard it here first.

HERE'S A BRIGHT LETTER

I have a ViewSonic E790 monitor, and for the most part it works great. But in some FPS games it is too dark in tunnels or dark rooms. I have the videocard set to high brightness and contrast. The monitor's controls are also set on the high side. I have an ATI 9800 Pro videocard, and the detail in the games is great. Do you feel that the monitor is the problem?

—DAVID RATCLIFF

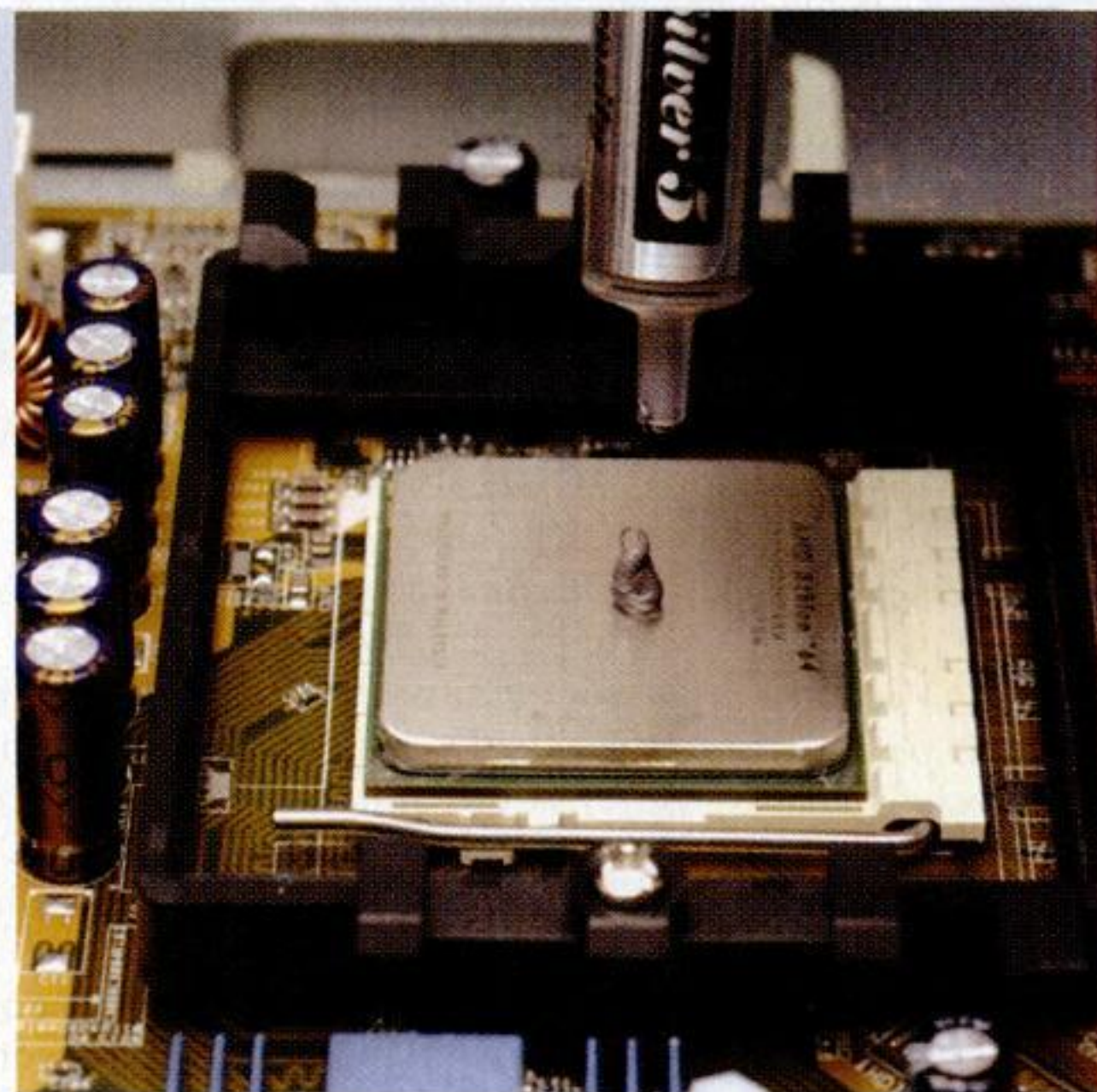
First, we recommend that you experiment a little with the videocard controls. Having both the brightness and contrast set to high could actually diminish some of the detail in dark areas. Adjust the controls independently, and see if that improves the image. Next try the same independent adjustment of the onscreen display settings. If you're still finding

ONE CUBIC-PINCH OF THERMAL PASTE

The chipset fan on my Abit NF7-S mobo recently started making a nasty vibrating sound. I bought a new fan, but after removing the old chipset fan, I was unclear on how much thermal paste to apply. Should it be paper thin or a millimeter thick? If you put too much on and it oozes out as you press down on the fan, can it cause an electrical short? Does the paste conduct, or just insulate?

—A. MANTO

Think of it this way: The thermal paste is there just to fill the nooks and crannies between the chip and the heatsink. We recommend you put a tiny dab on your chip, and then spread it out to create a paper-thin layer of paste over the surface of the chip. If you spread it on like you're



One dab really is enough. We use just a smidge of thermal grease to cover this great big CPU.

making a PB&J sandwich, there is a risk some will ooze out and short something out on the chip package.

scenes too dark in games, it's quite likely your issue is with the games themselves—the tunnels and dark rooms you're finding too dim are probably intentionally that way. This hunch is strengthened by the fact that you're satisfied with the monitor's performance in other applications. If *Doom 3* in particular is giving you problems, the Doc recommends the Duct Tape mod. You can get it at <http://ducttape.glenmurphy.com/>.

NEW LASER FLAVOR

I've become very interested in doing extreme things with my PC over the years. Now I want to change the color of the laser in my CD-ROM drive. How would one go about doing this?

—JEREMY SIPPEL

Have you ever watched a horror movie and thought "Oh no, she's not going to go upstairs," and then she goes upstairs? The Doctor

feels like that right now. There's so much that's simply wrong about this question that he can really only address the highlights. First, the laser operates at a fixed frequency, which determines its color. Second, the frequency of the laser is specified by the width of the grooves on the disc, which contain the data; muck with the laser, and you'll muck with the drive's ability to read discs. Third, the laser hovers very close to the disc and even if you pried off the bezel, you wouldn't see the beam anyway. We could go on, but that's probably enough.

SP2 CLUSTER CONFLICT

I just did a clean install of XP and Service Pack 2 and ran into a vexing problem. I reformatted my drive and installed from a slipstream XP SP2 disc. All went well. Then I used *Partition Magic* to change from the default 4KB cluster size to a more efficient

16KB cluster size. At reboot, I received a "disk read error," and my system appeared to be toast. I went around in circles for days with no apparent solution. Finally, I found two postings on Usenet that appear to match my frustrating experience. After going back to 4KB clusters, I'm back in business.

For some unknown reason, clean installs of XP Service Pack 2 will only run with a 4KB cluster size. Upgrades from SP1 will run with larger clusters, but a clean SP2 install will not.

Why would Microsoft sentence us to a 4KB cluster size? My poor little hard drive and I would much prefer larger clusters.

—MAD CLUSTER

Actually, you probably don't want a larger cluster size. For most home users, smaller clusters are more efficient. You see, each

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FIREFLY STUDIOS'
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file you store on the hard drive, regardless of its size, must take at least one cluster. That means if you save a file that's 1 bit, it will take up one cluster on the drive, and use 4KB of space. Because most home users have lots of small files on their computers, using smaller cluster sizes helps minimize the amount of drive space lost to slack. Therefore, the 4KB cluster size is ideal.

Granted, there are some applications that use large files and can gain a performance edge from using larger cluster sizes. If you use your machine to edit high-definition video, for instance, you might want to hold off on the SP2 upgrade, or alternately, set up a RAID array to use as your scratch disk. Because a RAID array allows you to choose a stripe size independent of the cluster size, you can completely bypass the 4KB pitfall.

YOU CAN'T TAKE IT WITH YOU

What is the best way to install a hard drive loaded with Windows XP from one computer to another? In the past, I have tried clearing out "enum" in the Registry, which leads to an excruciatingly long install. I have also tried setting up a new hardware configuration and selecting the new one each time, with mixed results. Finally, I've tried just installing and letting Windows reconfigure, again with mixed results. I know the right way is to start from scratch and reinstall everything (because of the mobo drivers), but I upgrade frequently and don't always have the time to do this. Thanks for any enlightenment.

—LAURENCE LOWY

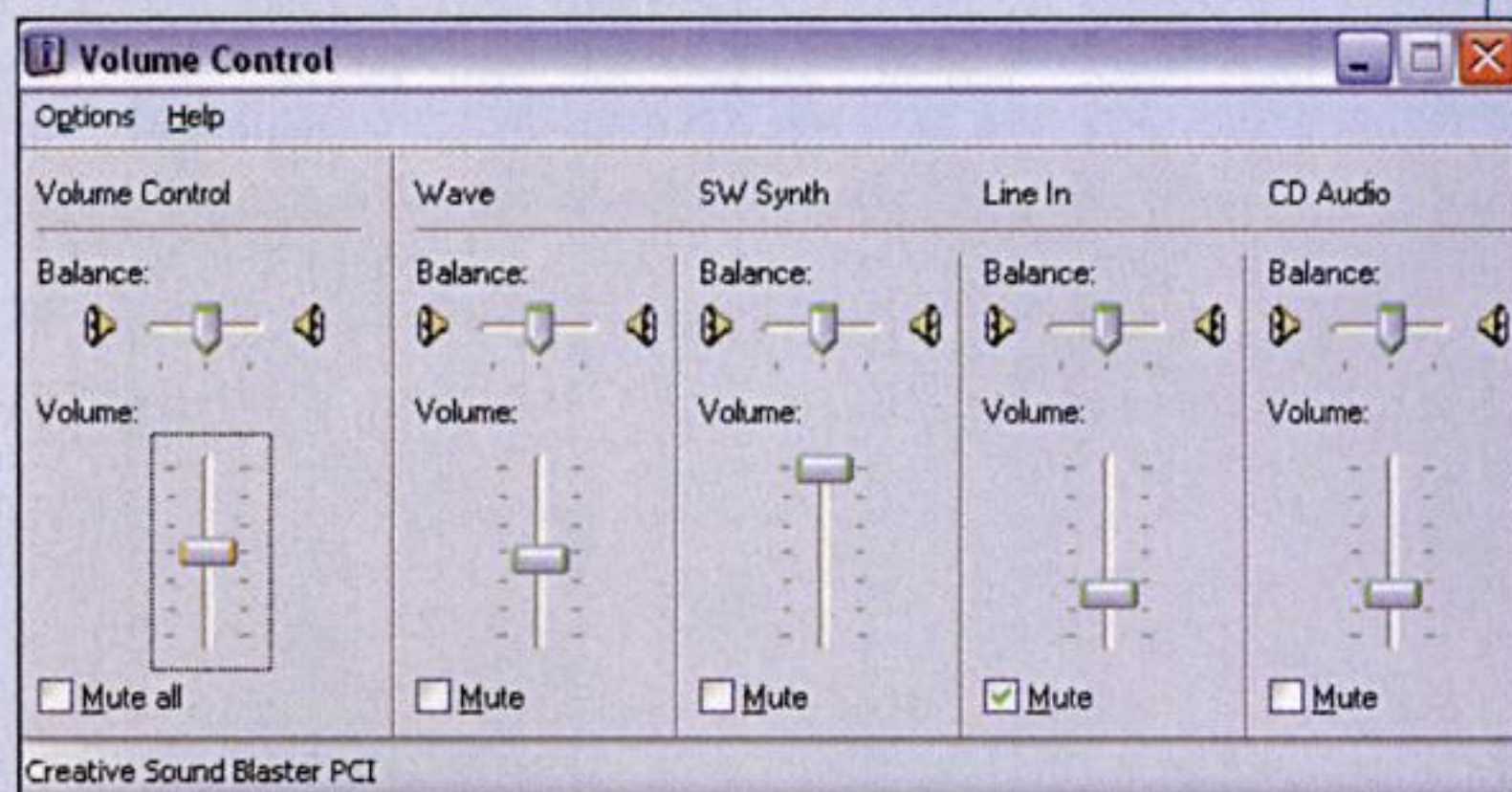
In reality, there's no "best" way to move a hard drive that contains Windows from one system to another—it's just not a good idea. Whenever you build a new system or upgrade your motherboard and processor, it's wise to start from scratch. After all, if you're going to spend a bunch of money on hardware upgrades, you don't want to cripple your new machine with a slowed-down OS.

OPTIMIZING SOUND QUALITY

I currently have Windows XP Pro running on my computer. I also have an Audigy 2 ZS soundcard paired with Logitech Z-680 speakers. My confusion lies in figuring out the optimal settings for the best sound quality. Do I set the volume control found in Windows to high, set the volume control on the speakers to high, and then use the volume control on the soundcard to adjust the volume from low to high? And what about the volume controls in various programs such as DVD software? Any insight you can shed on this would be appreciated.

—RICK E.

The Logitech Z-680 speakers are fantastic, but they do have a tendency to hiss when the volume levels are set high and there is no audio signal. With this in mind, the Doctor recommends that you set your Windows/Audigy 2 ZS mixer to about half volume and the Z-680 volume to about one-third or one-half



When adjusting your PC's speaker volume, a good place to start is by setting the Master Volume control in Windows (far left, above) to halfway. You should also set your speaker volume to one-third or one-half.

volume levels. It's also probably better, in this case, to use the PC to change volume levels rather than the control on the speakers—this way, you can avoid hearing the slight hiss of the speakers when your PC is off. The Doctor recommends against using maximum volume on either the speakers or soundcard, as that will induce the most distortion.

The volume controls on many DVD apps actually change Windows' master volume as well. This is unfortunate. If you finish watching a movie at night with the volume cranked up, the next time you boot your PC, you and your neighbors will be treated to the Windows jingle at full blast. Microsoft has plans to address this in its next OS version.

HARD DRIVE SPACE REDUCTION

I just purchased an LGA775 Pentium 4-based PC with the same mobo as the 2004 Dream Machine (Asus P5AD2 Premium). When installing the operating system on the 250GB hard drive, the install disk only recognized 131GB. I continued the installation hoping the problem might fix itself after I installed SP1, but nothing changed. Now I have a 131GB hard drive that should be 250GB. What gives?

—BLAIR BILLIARD

Any installation of Windows XP that doesn't include Service Pack 1 will run into the ol' 137GB barrier, which is the result of an outdated addressing scheme from a time (not many years ago) when hard drives didn't exceed this capacity. Because drives have moved way beyond the puny 137GB barrier, a new scheme has since been

introduced, moving the capacity goalposts out to an unthinkable 144 petabytes (one petabyte is 1,000 terabytes!). In order to reap the benefits of the new addressing scheme, it needs to be supported by your motherboard BIOS and you must run Service Pack 1.

Because you're already running Service Pack 1, and we know for a fact your motherboard can run big drives (DM 2004 ran 300GB drives without incident), it's a sure bet your remaining drive space is there at your disposal, it's just not visible in My Computer because it hasn't been partitioned. You can't see the unpartitioned space in Windows unless you look at the drive in Disk Manager, which you access by right-clicking My

Computer, clicking Manage, and then clicking Disk Management. You should see your C: drive's full capacity, with 131GB of it labeled "healthy" and the remaining 100GB listed as "unallocated space." Simply right-click this unallocated chunk, select "format," and then select the file system you'd like. Follow the dialog boxes until it's formatted. Keep in mind that once formatted, this drive space will constitute its own partition and show up as a separate drive in My Computer. If you want to combine both partitions into one huge 232GB chunk, you'll need to pony up for *Partition Magic* (www.powerquest.com), which can make changes to your hard drive's partitions on the fly. ■

Don't be sad. Even if your PC isn't working properly, you can fix it, and the Doctor is here to help. All you need to do is send him an e-mail at doctor@maximumpc.com. Don't goof around, just do it.



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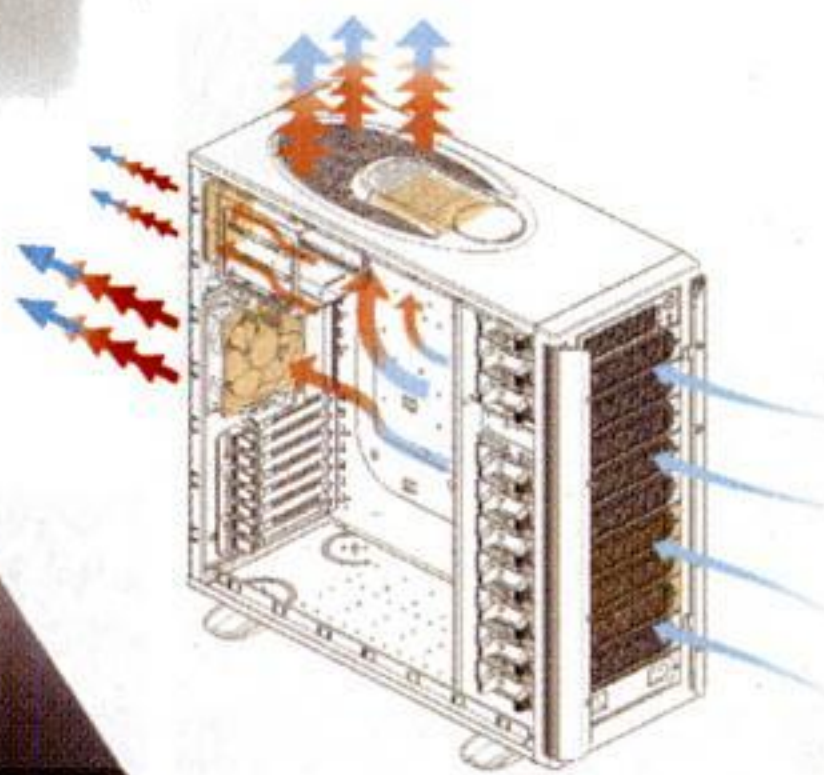
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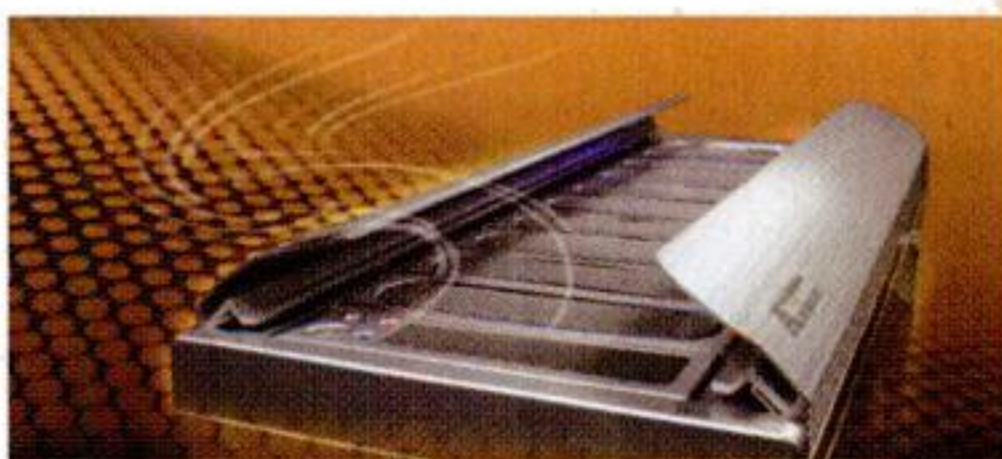
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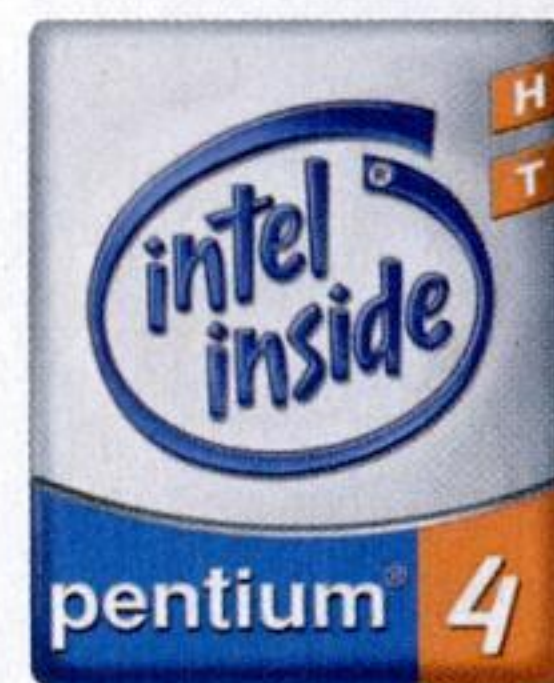
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How To...

A step-by-step guide to tweaking your PC experience

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Forget over-the-air and satellite broadcasting. Internet radio is fresh, unfiltered, and free

BY WILL SMITH

Hosting audio content on a website used to be difficult, expensive, and usually required *Real Player*. But as with most technology, what's tricky in one decade becomes trivial in the next. Today, any blogger with rudimentary audio-recording gear can deliver high-quality broadcasts.

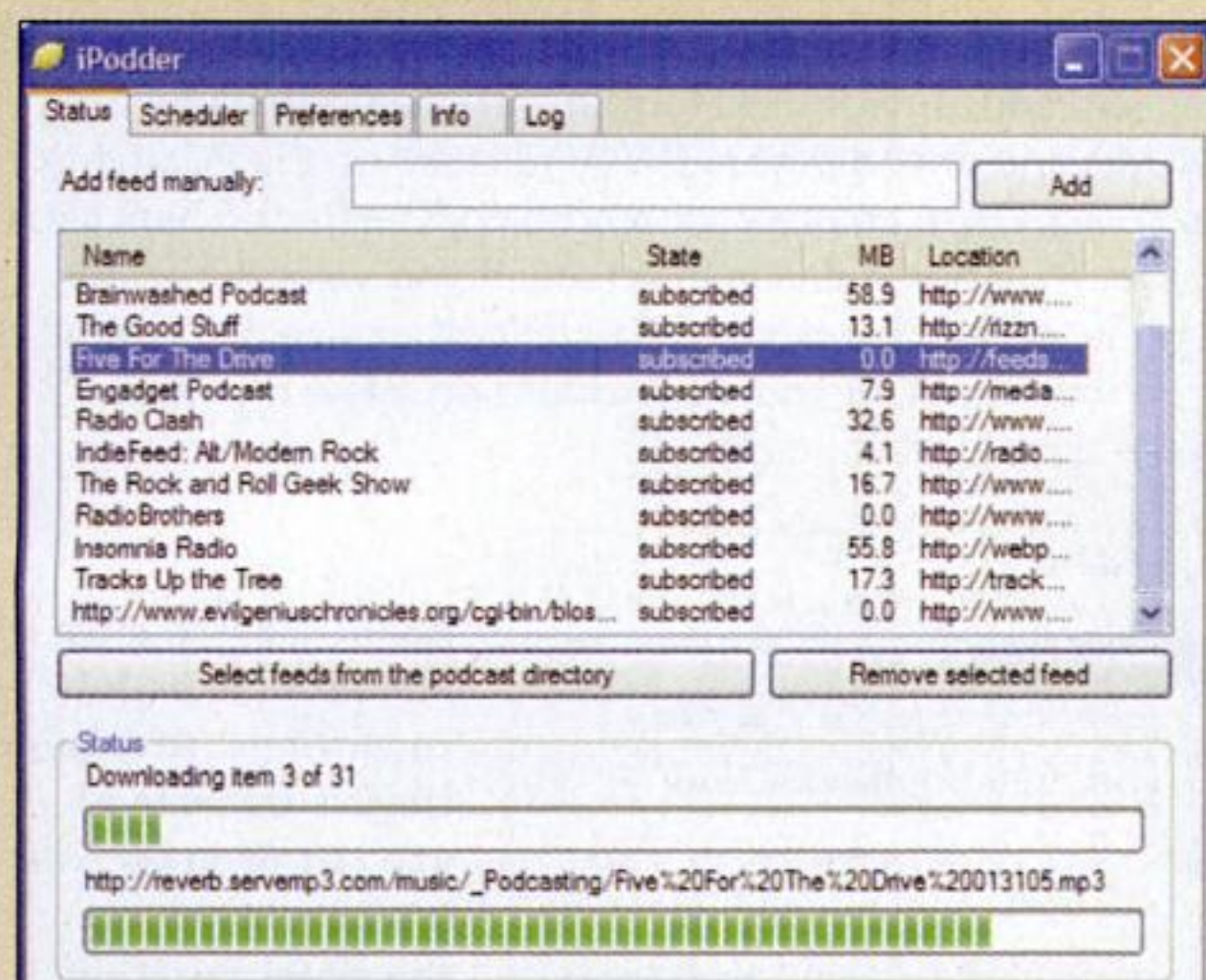
Even better, intrepid hackers have written software that will automatically transfer audio tracks from the net to an iPod or any other MP3 player—giving rise to the term “podcast.” Thousands of music lovers are now creating their own podcasts, featuring new music from podcast-friendly indie labels. Production values range from radio-quality to dude-in-the-back-of-his-van, but it's a fabulous way to find new music relatively untouched by the “music industry.”

But you needn't limit your listening to what's most easily available. You'll find loads of streams from radio stations and other sources, and though they're often in difficult-to-copy formats, sucking them directly from the net to your MP3 player can be simple—if you have the right software. You'll also encounter some programming that isn't streamed over the net at all; if you connect your AM/FM tuner to your PC, you can record anything broadcast over the airwaves and listen to it whenever you like.

Note: Recording this material for your own use is as legal as using a PVR to time-shift a television show. Distributing these files, on the other hand, is most likely illegal. Play it safe and download this stuff solely for your own enjoyment.

With that disclaimer out of the way, get ready to move beyond radio.

LISTEN TO THE PODCASTS



iPodder lets you automatically download as many independent podcasts as you'd like from the Internet, and then automatically copies them to your MP3 player.

The first thing you'll need for listening to podcasts is a podcasting app. We prefer *iPodder* (ipodder.sourceforge.net), which is available on this month's Maximum CD, but feel free to experiment with any client. Download and install *iPodder*, and then click the Status tab. There should be a few feeds already displayed in that window, but you'll want to add more that suit your own tastes before continuing. You'll find a massive list of feeds at www.podcast.net, but we've listed a few of our favorites in the sidebar on the next page.

Once you've selected a few feeds, click the Scheduler tab. We set the app to automatically check for new podcasts every eight hours or so. Once you've configured the appropriate settings, click the Preferences tab. Check “Hide iPodder at Startup” and “Check for new podcasts at startup,” but make sure “Play downloads” is unchecked. Note the location for your saved podcasts (it defaults to a folder called “My Received Podcasts” in the My Documents directory). You'll need that folder's location if you use something other than *iTunes* to copy music to your MP3 player. Now, go back to the Status tab and click “Check for new podcasts” to start downloading.

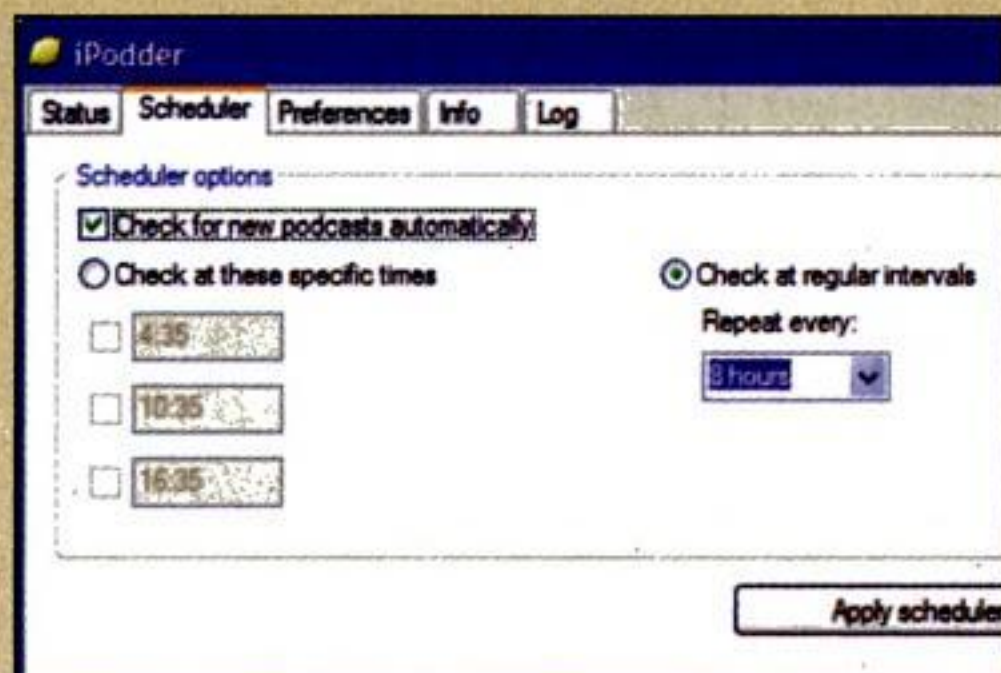
iTunes users are done at this point. Whenever a new podcast is

(Continued on the next page)

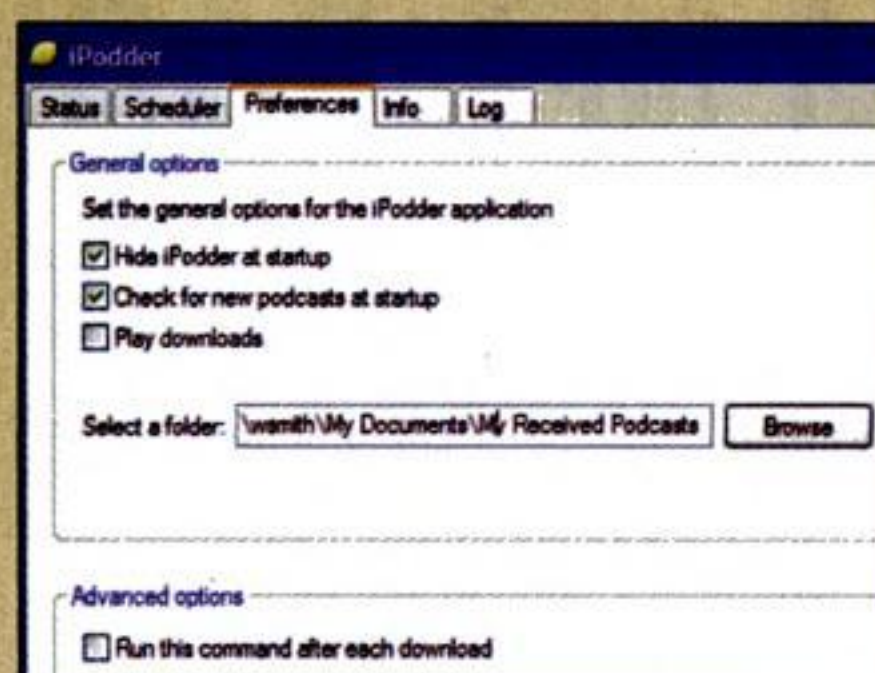
LISTEN TO THE PODCASTS (Continued)

downloaded, it will be copied to your player automatically, and a playlist will be created with the name of the podcast. If you use *Windows Media Player* to manage your player's tunes, you'll need to add My Received Podcasts to the folders that *WMP 10* monitors for new media. Click *WMP's Tools*

menu, choose Options, and then click the Library tab. Click the Monitor Folders button and add the folder where your podcasts are stored. Once you've done that, any podcasts that *iPodder* downloads will automatically be stored in your music library and synched to your MP3 player.



Once you configure the schedule *iPodder* uses to check for updated podcasts, you'll never know the app is running.



To lessen its impact, configure *iPodder* to minimize itself at startup and not play new downloads when they're downloaded.

RIP TRADITIONAL INTERNET RADIO

Creative Labs has quietly been shipping a utility that lets you rip damn near anything that comes out of your computer's speakers. It's called *Audio Stream Recorder*, and it's most likely on your Sound Blaster's installation disc. If you own a supported Creative Labs soundcard—all the way back to the Sound Blaster Live days—you can download the app as part of Creative's *MediaSource* software.

Once installed, the app makes ripping audio streams as simple as typing in the stream's URL and clicking OK. In fact, this program will let you record anything that it doesn't think is protected, which means it will record just about anything except DVD-Audio—which isn't a huge loss, in our opinion. *Audio Stream Recorder* won't automatically transfer the ripped file to your MP3 player, but you can use the same Monitor Folders trick we described in the section above.

Don't have a Creative Labs soundcard? The *Winamp* plugin *Streamripper* (streamripper.sourceforge.net) will accomplish the same trick for any audio streams that *Winamp* will play. Download and install the plugin, and then select the Configure Plugins option from the menu. Set the directory where you want the streamed files saved and you're set.

OUR BOOKMARKED FEEDS

The hard part about podcasting is sifting through the millions of crappy podcasts for those 10 gems you'll listen to every day. Here are a few of our favorites (the URLs are case sensitive):

• **INSOMNIA RADIO**
<http://webpages.charter.net/jevangelho01/IR.xml>

• **RADIO CLASH**
<http://www.mutantpop.net/radioclash/rssfeed.php>

• **INDIEFEED MODERNROCK**
<http://radio.weblogs.com/0141318/categories/altModernRock/rss.xml>

• **ENGADGET**
<http://media.weblogsinc.com/common/videos/pt/rss.xml>

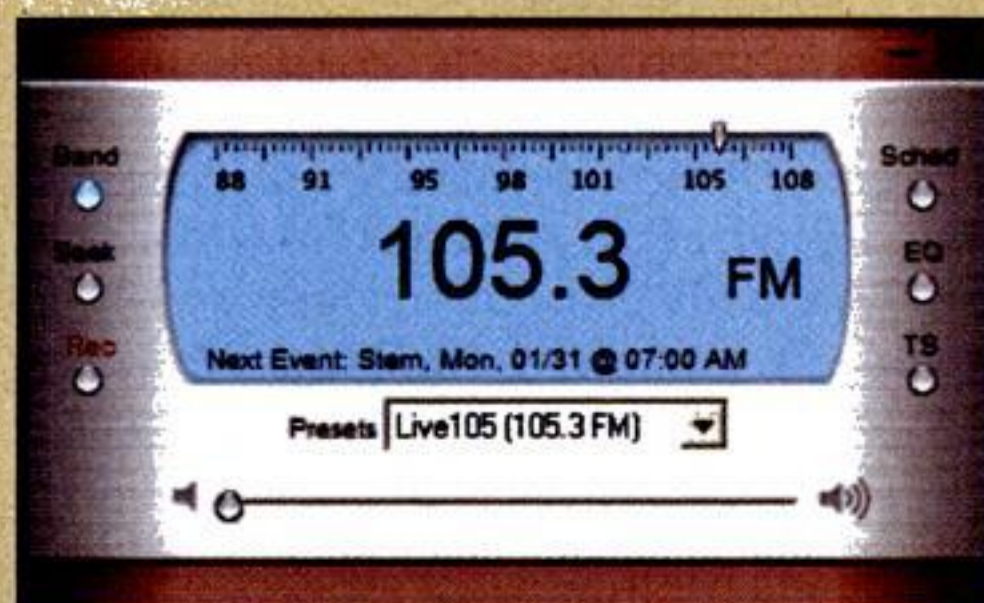
• **THE GOOD STUFF**
<http://rizzn.net/Scripts/podcast/rss/Nucks1.xml>

RIP STRAIGHT FROM THE AIR

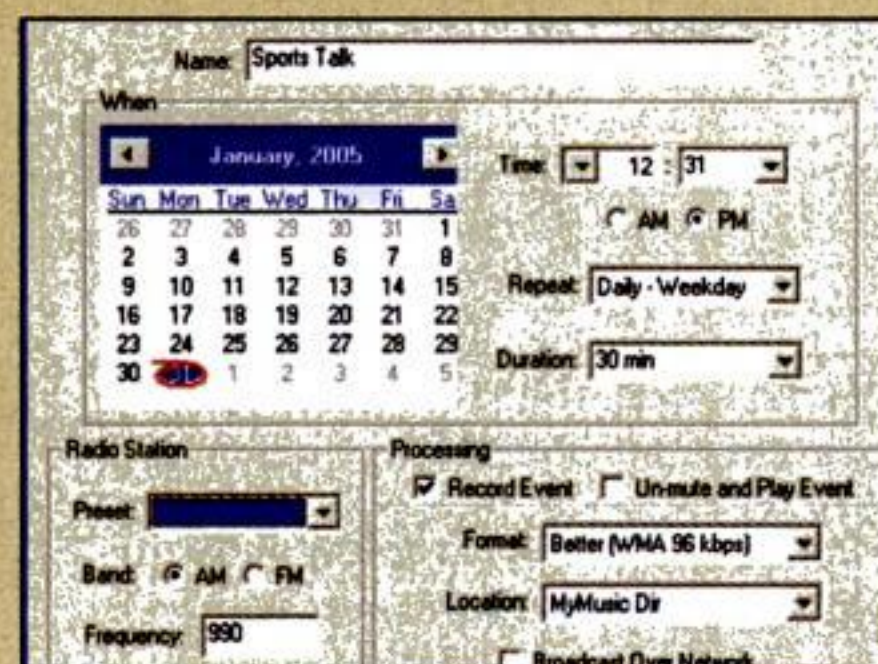
You'll need a tuner to rip audio from the radio. Many TV-tuner cards include an FM tuner, but AM tuners are rare. Griffin Technology's *RadioShark* (www.griffintechology.com) is a \$70 AM/FM tuner that plugs into your PC's USB port. It comes with software that behaves much like a PVR: You can listen to the radio in real time, but you can also pause and rewind live radio. And, of course, you can program the software for time-shift recording.

Once you've plugged the *RadioShark* into your USB port and installed the software, you can schedule a recording by clicking

the Sched button and then clicking Add. Set the schedule, quality, recording location, and desired format—the *RadioShark* records only to WMA and uncompressed WAV formats on the PC at this time—and click OK to create your recording. The *RadioShark* can't turn on your PC when it needs to record. If you want to record something when your computer wouldn't otherwise be on, you'll need to go into the BIOS and set it to turn on a few minutes before your broadcast starts. ■



The *RadioShark* is a PC-based radio tuner. Use it to not only listen to radio programming on your computer, but also to record any radio broadcasts.



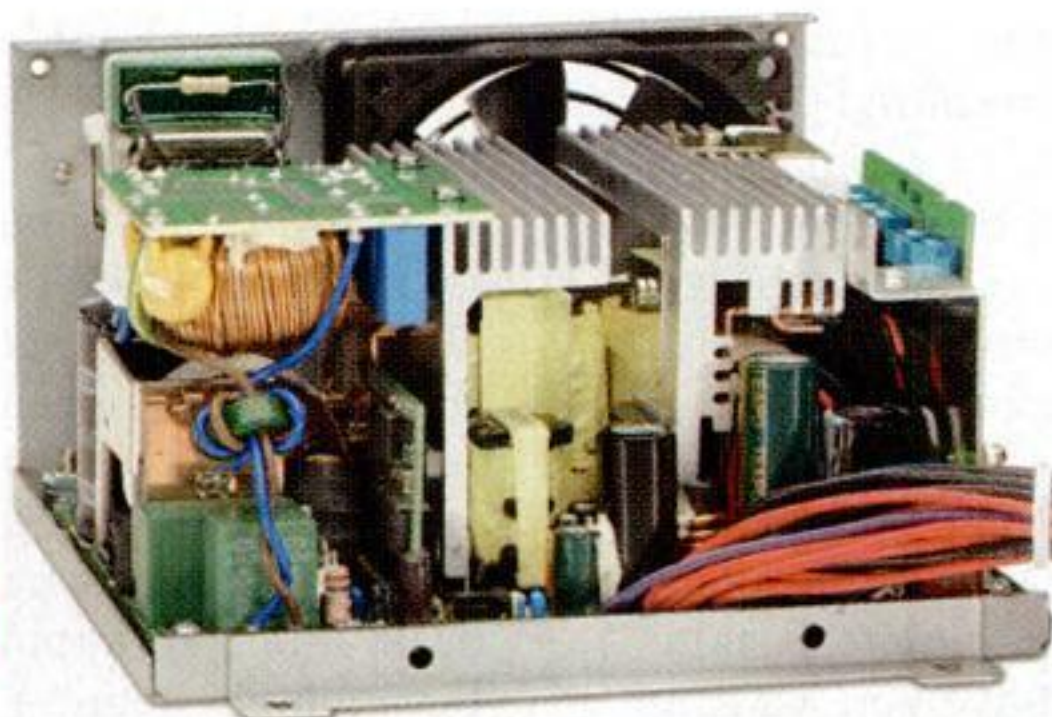
RadioShark makes it a snap to schedule recordings. Although there's no easy-to-use list of programs, it's easy to select the time, duration, and file format for your recordings.

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In the Lab

A behind-the-scenes look at Maximum PC testing

The New Benchmarks Are Here!

We're sticking to our real-world guns

It's been almost a year and a half since we last updated the zero-point system and benchmark suite that we judge all systems against. For 2005, we're updating all but two of our tests to stress the current generation of hardware.

We've now officially chucked *MusicMatch*, which we used to encode WAV files to high-quality MP3 files. We've always leaned away from synthetic tests because hardware vendors are too smart. If you use an artificial test developed by a benchmarking house, vendors start to optimize their drivers to perform well in those tests. And believe it or not, that doesn't always benefit the consumer. There have been documented cases of optimizations for synthetic tests that have adversely affected real-world performance. That's obviously not the way it should be. If there are driver optimizations—some would go so far as to label them “cheats”—they should at least benefit the consumer.

All but one of the benchmarks adhere to our philosophy of real-world testing; and by “real world,” we mean they're based on tasks and activities our readers will want to perform, conducted with tools and games that are readily accessible.

BAPCo's SYSmark2004

We're sticking with BAPCo's popular tool for measuring a PC's performance in everyday chores (the nonprofit consortium's name stands for Business Applications Performance Corporation). *SYSmark2004* uses common applications such as Microsoft's *Word* and *Excel*, Adobe's *Photoshop* and *After Effects*, and Discreet's *3ds max*.

In the benchmark routine, the office applications are used to check e-mail, update calendars, and create *Word* and *PowerPoint* documents. The creative apps are used to construct a website, create 2D and 3D objects, and produce a low-res movie.



Our new test beds can get 77fps out of *Doom 3*, even at 1600x1200 with 4x AA.

We've found *SYSmark*'s unique “think time” feature to be revealing. Old-fashioned application benchmarks time how fast *Word* scrolls through a long document, or how fast the machine can enter text. The problem with this approach is that human beings can't type at 8,000wpm or work at hyper speed. Beginning with *SYSmark2002*, BAPCo's benchmark began timing only how long it took to complete certain tasks that normally have you waiting.

SYSmark2004 is the latest iteration of that philosophy, and it's probably the most accurate measure of how fast a computer is at working with applications, because both AMD and Intel are now members of the BAPCo consortium. Certain applications, such as *WinZip* and McAfee *VirusScan 7*, run concurrently with other applications. When dual-core CPUs ship sometime

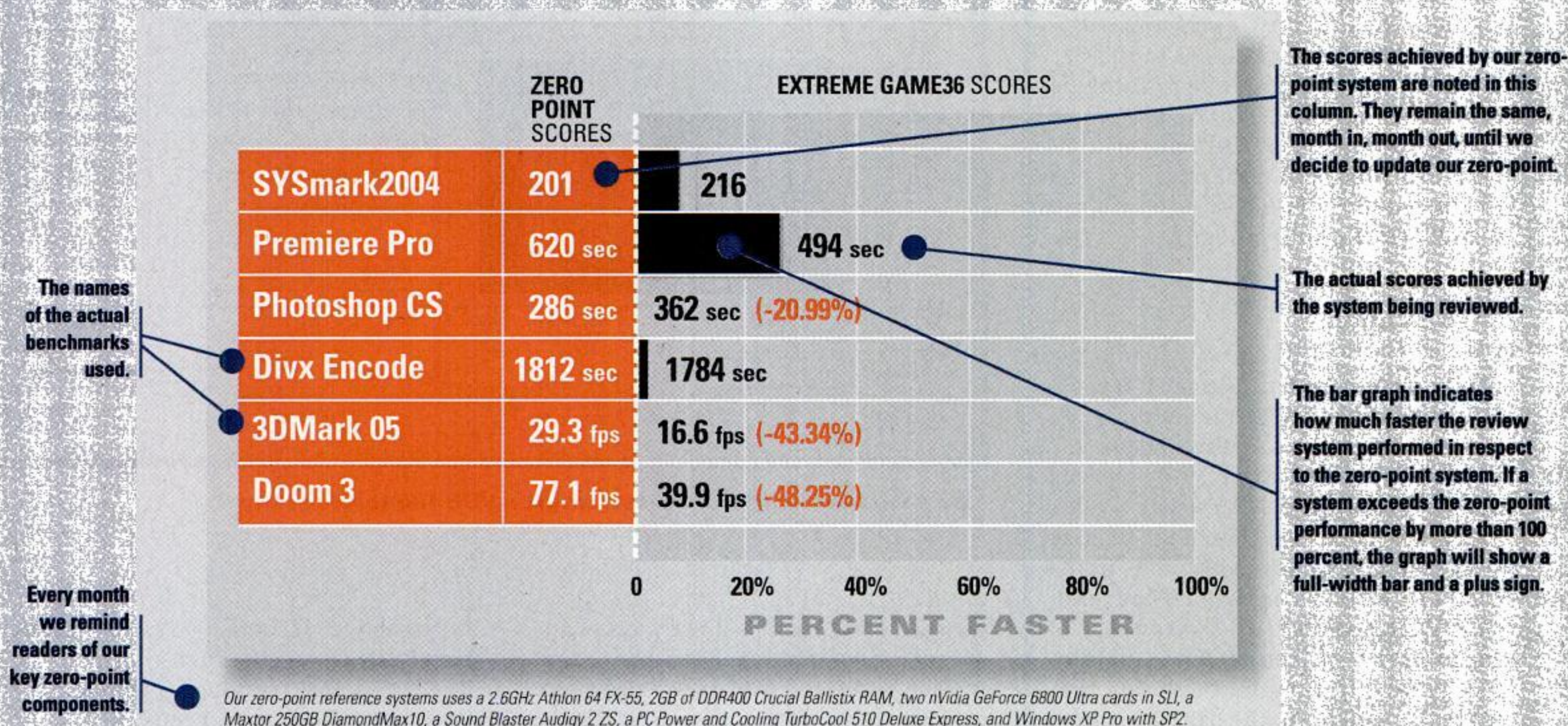
this year, we should see a boost in scores during this multitasking element of the benchmark.

SYSmark2004 reports a right-brain score for “Internet Content Creation,” a left-brain score for “Office Productivity,” and an overall score. The base score of 100 was achieved with a 2GHz P4 Northwood in a system equipped with 512MB of DDR266 running in single-channel mode and an 80GB IBM 7,200rpm DeskStar. Our new zero-point system is roughly 100-percent faster than that.

We've found that *SYSmark2004* is most sensitive to CPU processing power. After that, memory bandwidth, total RAM, hard drive I/O, and 2D videocard performance have their impact on the final score. We run *SYSmark2004* with BAPCo's Patch 2 applied to resolve incompatibilities with service packs from Microsoft.

How to Read Our Benchmark Chart

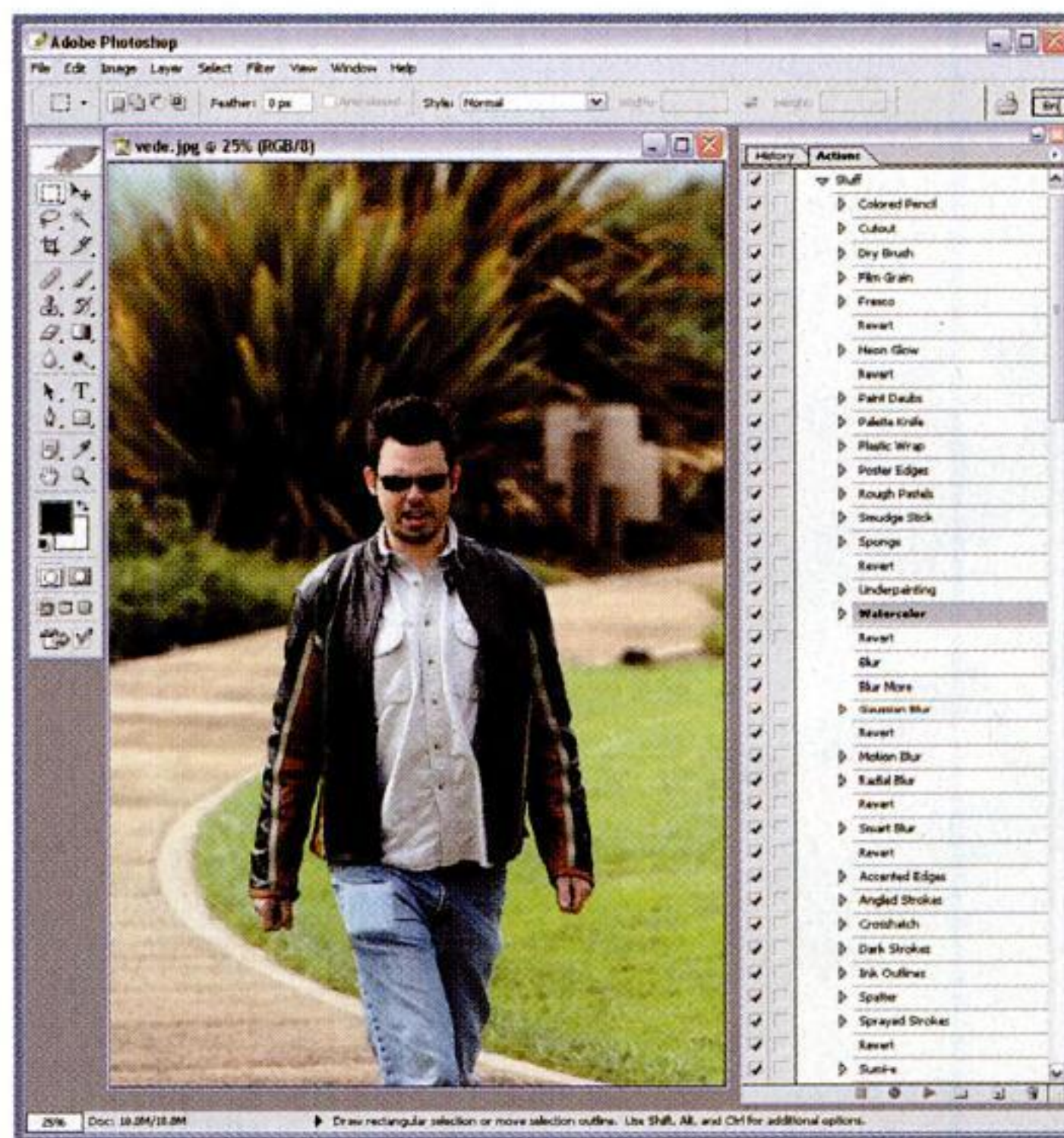
Maximum PC's test beds double as zero-point systems, against which all review systems are compared. Here's how to read the new benchmark chart, which first appears this month.



Adobe Premiere Pro

Our *Premiere Pro* test remains as it's been since the days of *Premiere 6.0*. We take an AVI sequence shot with a Canon XL1, run through several transitions, add a soundtrack, and export it all to a generic MPEG-2 file using the Adobe Media Encoder. Our *Premiere* benchmark is primarily a measurement of processor speed, and it has traditionally favored short-pipeline processors such as the Athlon XP, Centrino, and Athlon 64/FX.

With the move to *Premiere Pro*, however, Adobe rewrote and recompiled most of the program's core. *Premiere Pro* now heavily favors the Pentium 4 architecture and enjoys a significant boost from both Hyper-Threading and multi-processor systems. Adobe's video-editing program will probably be the first of our homegrown benchmarks to get a face-lift. We're planning to tweak our test to use video from an HD



We updated from *Photoshop 7* to *Photoshop CS* and experienced a drop in performance. Evidence of bloatware, perhaps?

DV cam, and we'll integrate video filters and transitions that use both the processor and the videocard's GPU.

Adobe Photoshop CS

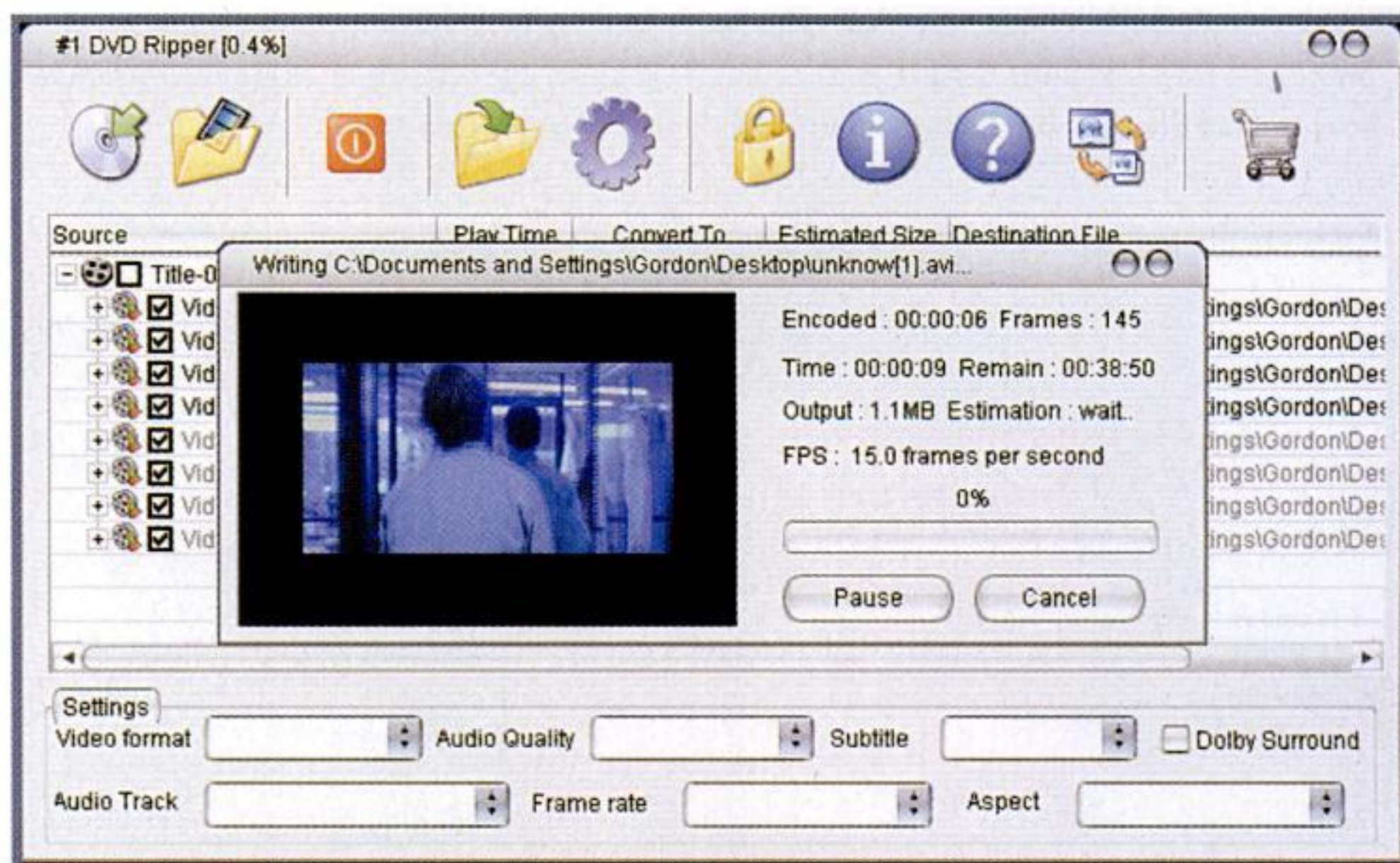
We're trading *Photoshop 7* for Adobe's latest uber image editor, *Photoshop CS*, but we'll use the same basic action script we adopted during the heat of the Apple-versus-PC wars. The foundation for Apple's claim of superiority over the PC is based partially on *Photoshop* filters; but the trouble with Apple's argument is that its tests encompass more fine print than a used-car contract. If you run this test on the second and third Tuesdays of a leap year, with this specific filter turned on, while standing on your head with a ham-and-peanut-butter sandwich in your left pocket—lo and behold—the Mac is faster. We decided to run 'em all and let the

Almighty sort it out: We take a JPG shot with a Canon EOS 10D and apply every freakin' filter available. This test thrashes the CPU, thrashes main memory, and is also slightly disk-intensive. Interestingly enough, we measured a performance drop moving from version 7 to the CS version, even though we're running the exact same action script. We plan to update the test when the new version of CS is available, and we'll probably move to a larger file size to take state-of-the-art digital cameras into account.

Divx Encode

We dumped our MP3-encoding test in favor of pure video encoding, because it taxes today's hardware just that much more. It can also turn into a massive time-sink, whether you're recoding a DVD you own for portable consumption or recoding a video that you've downloaded from the Internet.

For our test, we take a featurette from a DVD that we own (yes, we said *own*) and use DVDTox.com's #1 DVD Ripper to encode it to Divx (version 5.2.1). To take the optical drive out of the equation, we move the VOB file to the hard drive, where we do a second-pass encode. Right now, the test seems to slightly favor the Pentium 4, but not by much. This test is CPU-intensive, RAM-intensive, and it touches



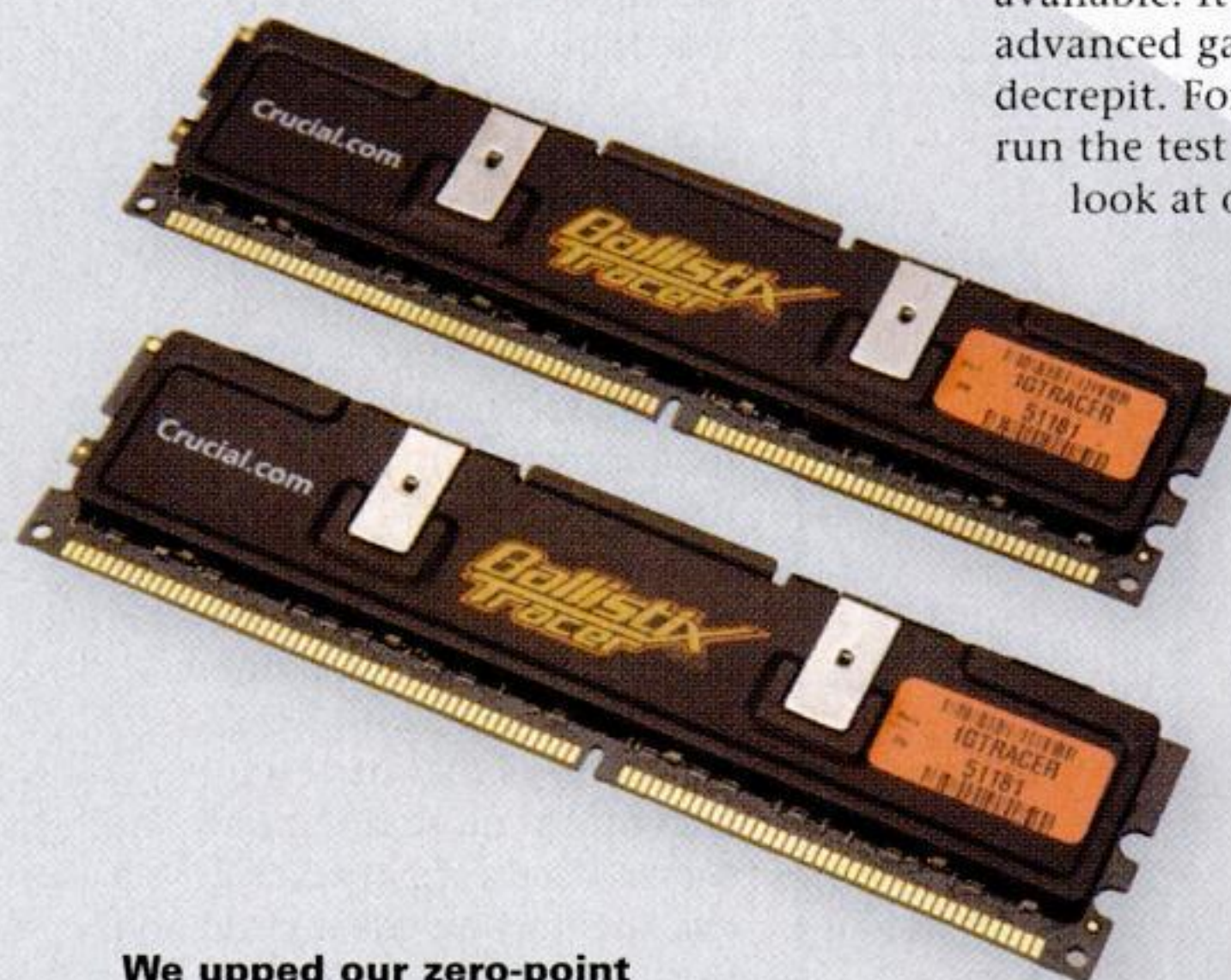
We time how long it takes to convert a VOB file to Divx format.

the hard drive, too. It's slightly less of an overall system test than *Photoshop CS*, but it is real-world and it's still pretty rigorous even for today's fastest systems. It takes roughly 30 minutes to encode our video, and this time should shrink as faster CPUs are brought to market.

noted above, *3DMark2005* is a synthetic benchmark—no commercial game uses its engine—and it's no wonder: With resolution set to 1280x1024, and 4x antialiasing and 4x anisotropic filtering enabled, even our top-speed,

3DMark2005

FutureMark's *3DMark2005* is the most punishing graphics test available. It makes today's most advanced games look old and decrepit. For our purposes, we run the test with patch 1.2.0 and look at only Game 3. As we



We upped our zero-point memory allotment from 1GB to 2GB, using Crucial Technology's Ballistix Tracer RAM.



TurboCool power supplies have never let us down, so we saw no reason to switch.



We've upgraded from the 64 FX-51 to AMD's blazing Athlon 64 FX-55.

SLI-equipped Athlon 64 FX machine just barely kicks out playable frame rates.

Although this benchmark isn't indicative of what today's games can do, it's probably an accurate simulation of the graphics power that games will demand 18 months from now. This benchmark is mostly a GPU test, but memory bandwidth and overall system speed are also factors. Our zero-point system kicks out a good—but not great—29.3fps.

We would like to use Valve Software's *Half-Life 2* as a DirectX test, but because the game is automatically updated via Steam each time it's installed on a new system, it's useless as a repeatable benchmark. If Valve ever creates a benchmark version of the game down the road, we'll definitely consider adding it to our suite.

Doom 3

Doom 3 performance isn't important just because it's a high-profile game from id Software, it's important because of the myriad games that will use the same engine. If your PC can deliver smooth frame rates playing *Doom 3* now, it'll give you butter when games such as *Quake IV* reach store shelves.

We decided to run *Doom 3* at 1600x1200 resolution as a baseline, to suit the higher resolution of today's LCD monitors. We also set the game to "high quality" and ran it with 4x antialiasing and 4x anisotropic filtering. The game has an "ultra quality" setting, for cards with 512MB frame buffers, but we decided that might be going a little too far, given that cards with that much local memory aren't yet available. For the record, our SLI rig plays *Doom 3* just fine with that setting.

For our tests, we patch *Doom 3* to version 1.1 and use the default demo1. Our zero-point system delivers 77.1fps, which we believe is the minimum frame rate that looks smooth.

New Test Beds

PCI Express and SLI should ensure a long life for our new test rigs

We considered just upgrading our old zero-points, but after considering the benchmark scores that new machines are hitting, and what they're likely to hit in the next 12 to 24 months, we decided a complete overhaul was in order. The old machines, while still serviceable, wouldn't have enough power to keep review systems from doubling or tripling our zero-point score. The fact that our old test systems used AGP, and offered no option for PCI Express graphics cards, had us boxed into a corner, as well; our old zero-points simply wouldn't allow us to test new videocards.

It didn't take long to nail down a configuration for our new rigs. We needed PCI Express, and we had to have SLI capability. That left us with one option: Asus' A8N-SLI Deluxe—as of press time, it's the only SLI motherboard available.

Our previous fleet of test beds was the first to consist of non-Intel chipsets and CPUs. Although we were initially worried about the nVidia nForce3 Pro 150 chipset's unproven track record, we experienced *zip* problems during the past year and a half. We expect similar trouble-free performance from the nForce4 SLI chipset that will serve as the foundation for our new test beds.

Once we chose the motherboard, picking the processor was a no-brainer: We went with AMD's Athlon 64 FX-55. We crowned AMD's CPU the speed king several months ago, and its status hasn't changed since. This Socket 939 proc features 1MB of L2 cache, an on-die memory controller, and support for 64-bit extensions. We won't be running 64-bit Windows as our standard OS, but having the option gives us a lot more flexibility than any current P4s can provide. We bumped main system RAM up a notch by requisitioning two 1GB "sticks" of Crucial Ballistix Tracer DDR400.

The graphics department was equally easy to spec out. Our zero-point reference

system will house two nVidia GeForce 6800 Ultra videocards running in SLI. We won't configure every Lab system with dual videocards; only those machines that will be used as the basis of comparison for system reviews.

Mass-storage duties fall to Maxtor's impressive 250GB DiamondMax 10 hard drive. This drive has a huge 16MB buffer, supports NCQ (native command queuing), and is natively SATA; that is, it doesn't use a PATA-to-SATA chip as most first-gen SATA drives do. It will pair-up well with the nForce4 SLI chipset, which features native SATA support.

In the past, we've conducted all hardware testing—with the notable exception of hard drives—on test beds based on an Athlon 64 CPU and nForce3 chipset. These systems don't support SATA, though, so we benchmarked hard drives using test beds based on a Pentium 4 CPU and Intel 865P chipset. We later migrated to Intel's newer 925XE chipset, because it supports additional SATA features (including NCQ). Because our latest test beds support both NCQ and SATA 3G drives, we'll transition hard-drive testing to that platform, too.

We haven't given up on soundcards just yet, so we've chosen Creative Labs' Audigy 2 ZS card as our audio standard bearer. We decided against graduating to the more-expensive Audigy 4 Pro because the only significant differences between the two generations are improved DACs and a fancier break-out box.

It seems a safe bet that 2005 will be the year in which everyone finally pays attention to power supplies, but we'll stick with PC Power and Cooling's Turbo-Cool 510 Express and Turbo-Cool 510 SLI models. They get just a tad loud under full load, but supply stable, reliable power to the wide assortment of hardware we review; besides, we've never had one expire on us. ■

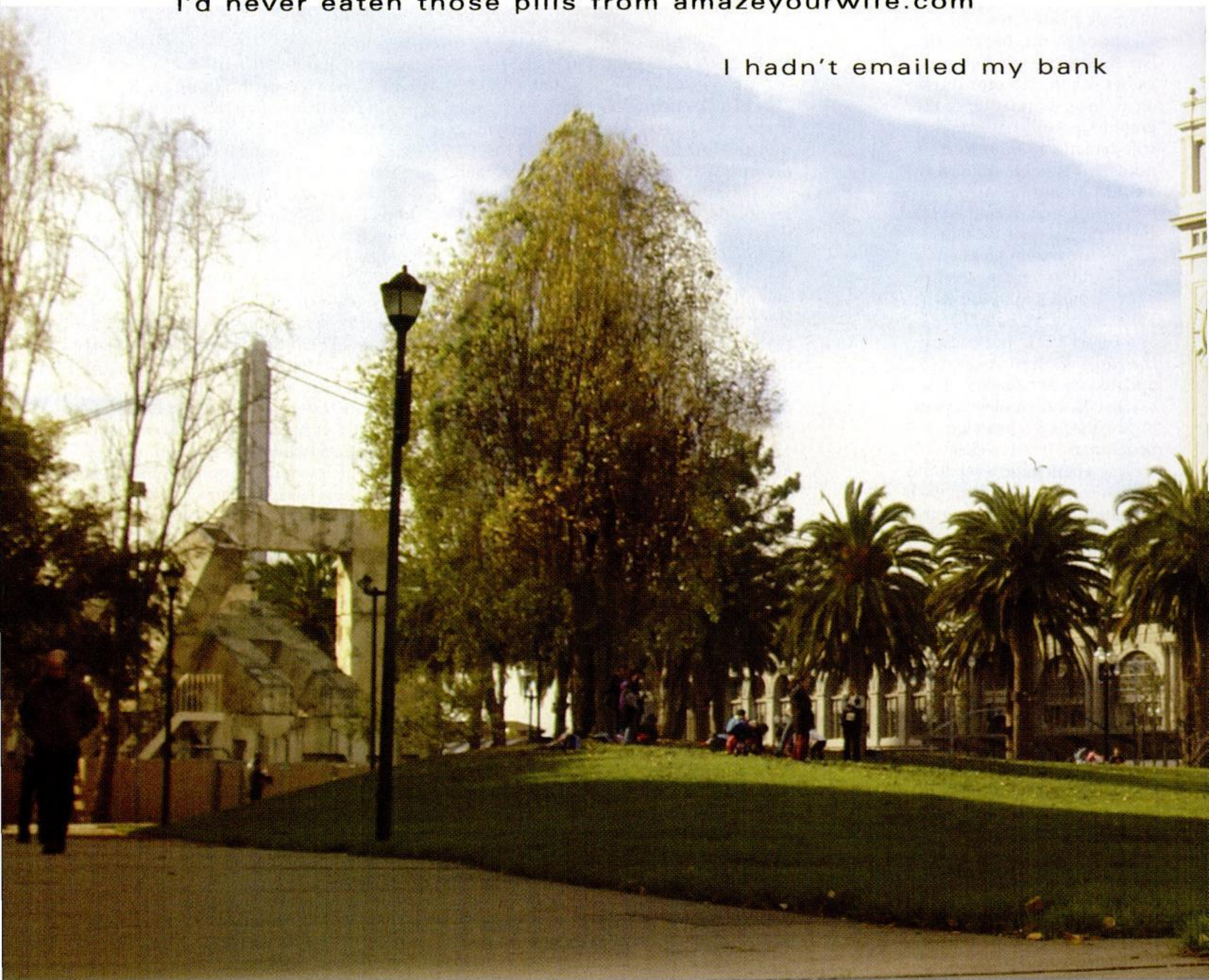
TEST BEDS AT A GLANCE

	OLD	NEW
CPU	2.2GHz Athlon 64 FX-51	2.6GHz Athlon 64 FX-55
Chipset	nForce3 Pro 150	nForce4 SLI
Videocard	ATI Radeon 9800 XT	nVidia GeForce 6800 Ultra (in SLI mode)
RAM	1GB registered DDR400 Corsair	2GB DDR400 Crucial Ballistix Tracer
HD	250GB Western Digital WD2500JB PATA	250GB Maxtor DiamondMax 10 SATA
Soundcard	Sound Blaster Audigy 2 ZS	Sound Blaster Audigy 2 ZS
PSU	TurboCool 510 Deluxe	TurboCool 510 SLI
Motherboard	Asus SK8N	Asus A8N-SLI Deluxe

I wish

I'd never eaten those pills from amazeyourwife.com

I hadn't emailed my bank



PC cases



power supplies



cooling & lighting products



account number to that Nigerian dictator

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Kaos Extreme Game36

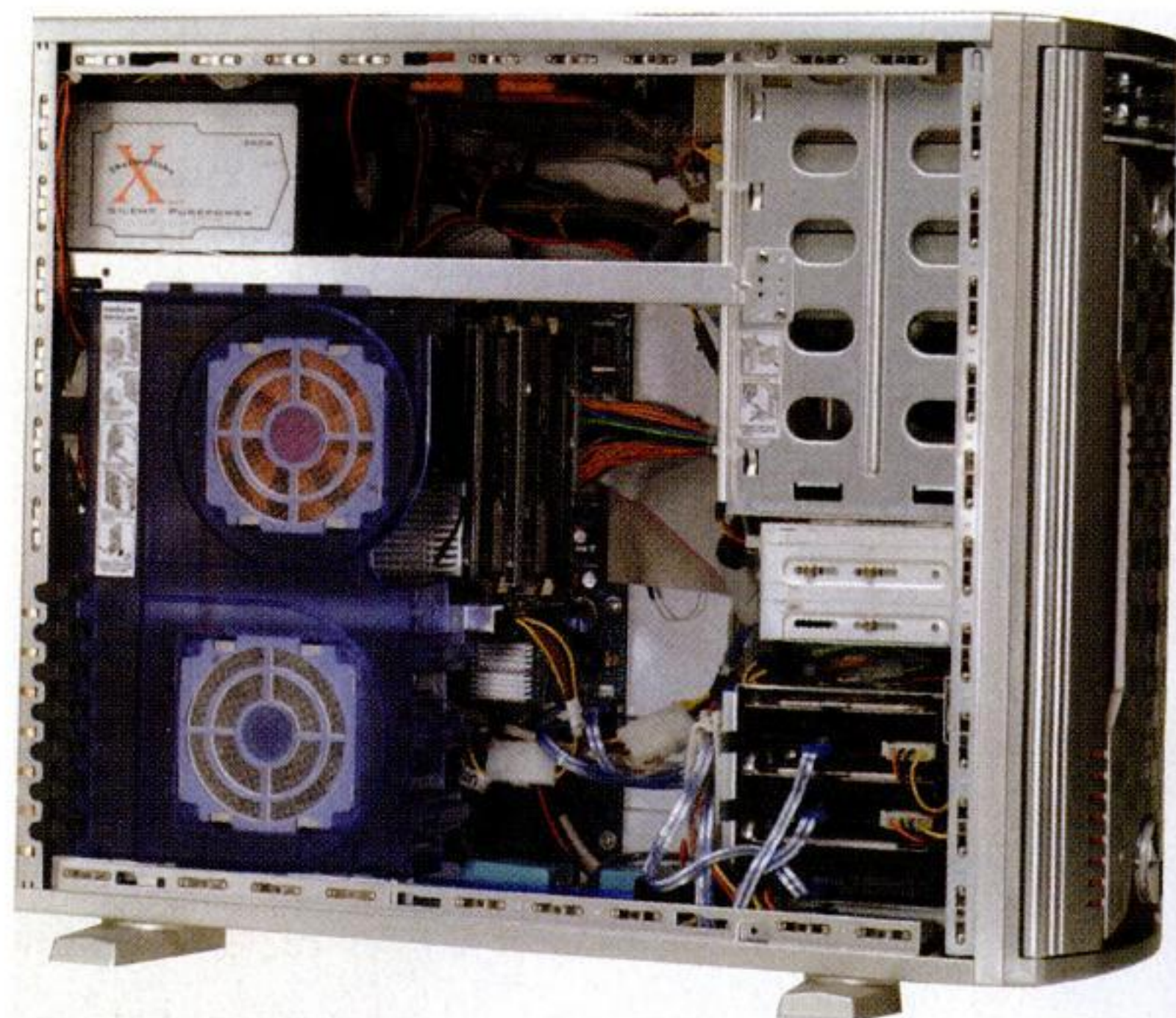
Extreme machine packs some unextreme components



It seems as though an eternity has passed since we last reviewed a PC bearing an Intel badge. In fact, when the Kaos Extreme appeared, one editor was heard to muse, "they just haven't been in demand since the XP-38 came out."

Kaos' Extreme Game36 PC aims to change that mindset with its hot-off-the-fab Pentium 4 660 CPU. For those who skipped the news story on page 14 of this issue, the 660 is a beefed-up P4 560 chip. It's still clocked at 3.6GHz, but Intel has doubled the L2 cache from 1MB to 2MB. The proc also supports EM64T technology (aka AMD64 instructions and hardware, plus support for Microsoft's No eXecute).

OK, enough about the processor. It's the machine around the proc that lets a vendor strut its stuff, and Kaos takes an interesting tack with the Game36 that we're not entirely sure we understand. The P4 is not strapped into a



The Pentium 4 leads in application performance but the Game36's single videocard can't compete with SLI big boys.

faster 925X or XE board, but a slightly slower 915P-based motherboard. We thought it odd that the company would use the No. 2 Intel chipset for such a new processor, but we soon spotted a trend in this PC's specs.

The machine has RAID, but it uses a pair of 36GB WD Raptors. Since the intro of the 74GB Raptor, the 36GB has been the No. 2 model. Kaos also took a shortcut by dropping a GeForce 6800 GT into the system; which is... you got it, No. 2 to the GeForce 6800 Ultra. Granted, an Ultra wouldn't have been the best fit, as the machine will never run SLI, but wouldn't an ATI X850 XT Platinum Edition have been a better choice? It is arguably the fastest videocard for non-SLI applications. Come to think of it, even the P4 660 is No. 2 to Intel's new 3.73GHz P4EE.

Pardon us, but just where is the "extreme" in all of this?

Gaming performance isn't bad

for a single-slotter, but the ABS SLI (reviewed on page 76) illustrates the meaning of two against one. The ABS delivered benchmark numbers that were about twice as fast in *Doom 3* and *3DMark05* Game 3.

This entire review seemed headed south until the processor pulled the Game36's fat out of the fryer. Although its gaming performance was second-rate, the P4 delivered primo performance in our updated apps test, with a *SYSmark 2004* score of 216.

The Game36 also kicked out an impressive score in *Premiere Pro*, making it the second-fastest machine we've tested with Adobe's popular nonlinear editing program. So where does this leave the Game36 overall? Its application performance is quite good, thanks to the new 2MB Prescott core, but it takes a back seat to SLI-equipped rigs when it comes to gaming. This state of affairs, combined with the system's second-tier hardware, makes it hard for us to swallow Kaos' claim that this is a high-powered gaming PC—especially when compared with the ABS SLI box, which costs just \$300 more.

—GORDON MAH UNG

UNDER THE HOOD

THE BRAINS

CPU	Pentium 4 660 (2MB L2)
Mobo	Intel D915PBL
RAM	1GB DDR2/533 Corsair (two 512MB sticks)
I/O ports	7 USB (4 rear, 2 top, 1 front), 2 FireWire A (1 top, 1 rear), parallel, serial, optical, coax SPDIF
LAN	Gigabit Ethernet

DISPLAY

Videocard	nVidia GeForce 6800GT (350MHz core, 1000MHz DDR)
------------------	--

STORAGE

Hard drives	Two 36GB Western Digital Raptor 10,000rpm SATA running in RAID 0 ICH6R south bridge and Seagate 200GB Barracuda 7200.7
Optical	Sony DW-D22A 16x DVD+/-R, 2.4x DVD+R9, 48x CD-R, JLSMS-XJ-166S DVD-ROM

AUDIO

Soundcard	Onboard 7.1-channel HD Audio, including Dolby Digital Live support
------------------	--

FINE DETAILS

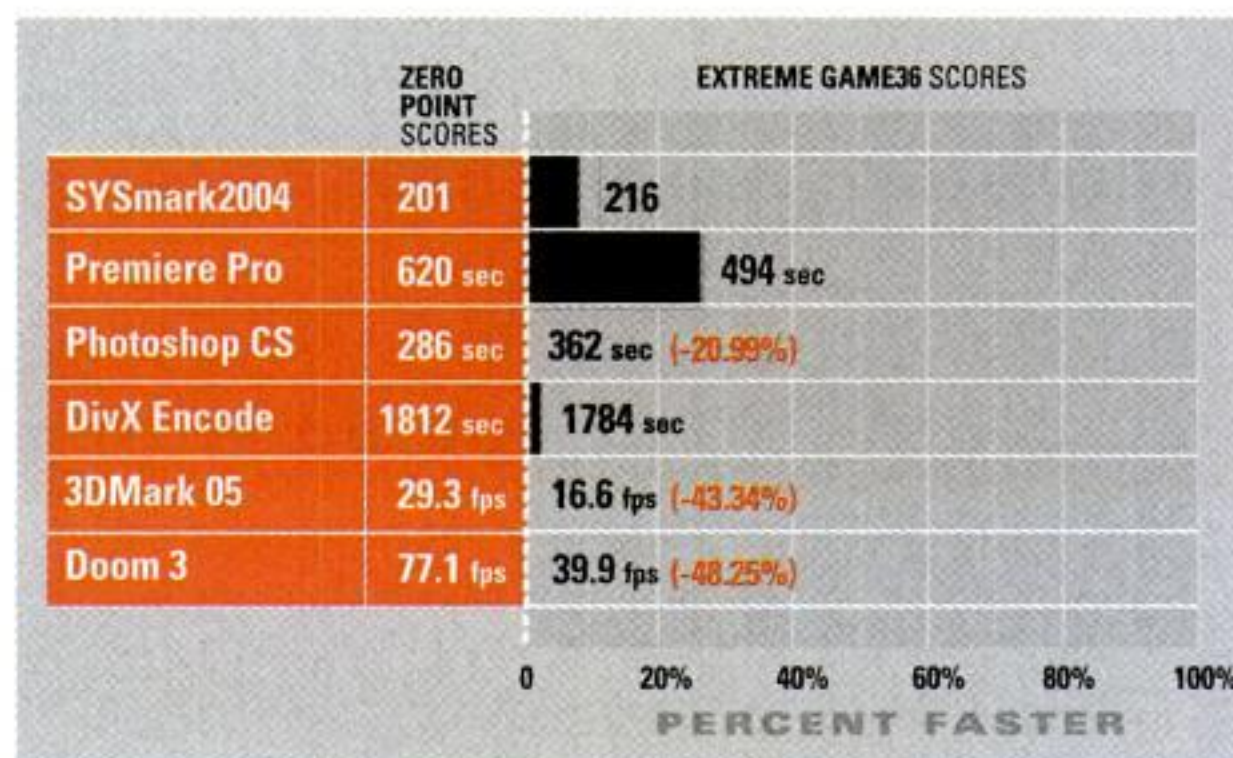
Case	KAOS (ThermalTake) Damier Case with LED temperature displays, and variable-speed fan control
Fans/extras	3 90mm, 1 80mm, fan bay, top ports, cold cathode lights, media reader, floppy drive

BUNDLE

Windows XP Pro, Dolby Digital Live Driver

BOOT: 37 sec.

DOWN: 22 sec.



Our zero-point reference systems uses a 2.6GHz Athlon 64 FX-55, 2GB of DDR400 Crucial Ballistix RAM, two nVidia GeForce 6800 Ultra cards in SLI, a Maxtor 250GB DiamondMax10, a Sound Blaster Audigy 2 ZS, a PC Power and Cooling TurboCool 510 Deluxe Express, and Windows XP Pro with SP2.

MAXIMUM PC VERDICT

6

+ DOOM

Double-layer burners, good app performance, and direct control over most system fans.

- GLOOM

Too many of last year's parts.

\$3,300, www.kaospc.com

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Flow Indicator

HIGH PERFORMANCE

ULTRA QUIET CPU COOLER CNPS7700

Supports both Intel & AMD (Socket 775, 478, 754, 939, 940)

120mm Fan!



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- 120mm fan inside the FHS maximizes airflow and makes installation easier.
- Adjustable fan speed controller (FAN MATE 2) enables control of noise and fan performance.

QUIET CPU COOLER CNPS7000B/LED

Supports both INTEL & AMD (Socket 478, 462, 754, 939, 940)



- Does not generate noise or vibration in Silent Mode.
- Pure Copper and Pure Aluminum base materials ensure excellent heat dissipation.
- 92mm fan inside the FHS maximizes airflow and makes installation easier.
- Adjustable fan speed controller (FAN MATE 2) enables control of noise and fan performance.
- To use this product on Socket 775, ZM-CS1 must be purchased separately.

HIGH PERFORMANCE

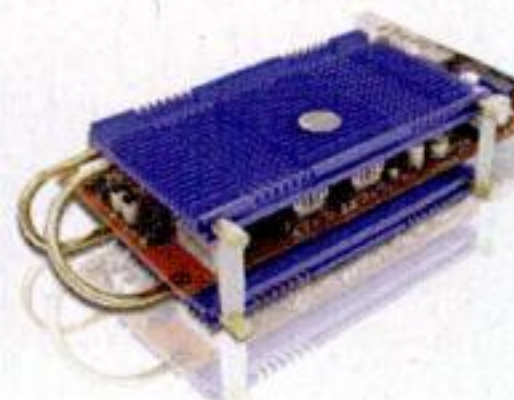
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ABS Ultimate M6

And you thought SLI was only for the rich or well-connected

SLI-equipped PCs trigger two reactions in people. There's a Pavlovian drooling at the sight of dual 6800 Ultras working over games and benchmarks. And then there's a Fred Sanford hand-clutch to the heart, accompanied by an "I'm coming, Elizabeth!" holler, once you see the price tag.

ABS' Ultimate M6 is the first SLI rig we've reviewed that will have you salivating *without* choking on the price. A PC's price doesn't really matter much to us when the rig is stacked with the latest hot hardware, but the Ultimate M6 is priced so low—and stacked so well—we twice asked ABS to verify the information we'd been given.

The Ultimate M6 features two GeForce 6800 Ultras in SLI mode, plugged into an Asus A8N-SLI Deluxe motherboard. There's 1GB of Corsair DDR400 memory, an Audigy 2ZS soundcard, and an

Asus wireless card that can act as a soft access point. Optical storage comes care of a Sony drive that burns single-layer DVDs at 16x, and double-layer DVDs at 2.4x.



The Ultimate M6 uses an upside-down ATX design—an increasingly popular approach among PC makers.

Not every-thing is roses, of course. The machine packs a pair of 160GB Seagate Barracuda 7200.7 drives in RAID 0. The .7 stands for seventh-generation; current 'cudas are eighth-gen. Oddly enough, although the drives support NCQ, ABS configured the machine with a Silicon Image Sil3114 SATA controller, which doesn't support NCQ. It's not like ABS didn't have an option: It simply could have run the drives off the nForce4 chipset, which *does* support NCQ.

Performance-wise, the Ultimate M6's SLI certainly didn't disappoint: In gaming benchmarks, it spanked the single-card Kaos Game36 (reviewed on page 74) with a leather paddle. Even our brand-new zero-point system received a little schooling when the Ultimate M6 bested its Game 3 score by 25-percent. What the hell? We can't figure out the source of this performance. Perhaps it's the result of BIOS tweaks. Perhaps it's a driver drop the public has no access to. *Grrr*. There was no such

surprise in *Doom 3*, but the Ultimate M6 does make the game playable at 1600x1200 with 4x AA and 4x anisotropic filtering.

The Ultimate proved not-so-ultimate when it came to applications. The Kaos system roared in *SYSmark2004* and flexed P4 Hyper-Threaded muscle in *Premiere Pro* to clothes-line both our zero-point *and* the Ultimate M6. Our zero-point burned the Ultimate M6 in *SYSmark2004* and *Premiere Pro*, too. This was a shocker, considering the component similarities between the two rigs.

This system's biggest selling point, of course, is its price: It's practically a bargain at \$3,600. Compare that with the \$6,000 Voodoo Rage F:5 and \$6,100 Kick Ass Gaming PC Katana SLI we reviewed in March, or the \$4,775 Velocity Micro Raptor 64 Dual X we reviewed in February. And when you consider that PCI-E 6800 Ultra cards cost as much as \$700 on the street, fully *half* the price of the Ultimate M6 lies just in videocards.

The Ultimate M6 would easily score a Kick-Ass award if the lower-rated Kaos hadn't spoiled its day in the sun by aching it in two applications benchmarks. But for gamers hell-bent on frame rates, the Ultimate M6 is the ultimate bargain.

—GORDON MAH UNG

UNDER THE HOOD

THE BRAINS

CPU	Athlon 64 FX-55 (1MB L2)
Mobo	Asus A8N-SLI Deluxe
RAM	1GB DDR400 Corsair (two 512MB sticks)
I/O ports	6 USB (4 rear, 2 front), optical and RCA SPDIF, 2 FireWire A, parallel
LAN	Dual Gigabit Ethernet, 802.11b/g

DISPLAY

Videocard	nVidia GeForce 6800 Ultra in SLI (425MHz core, 1100DDR)
------------------	---

STORAGE

Hard drives	Two 160GB Seagate Barracuda 7200.7 in RAID 0 on Silicon Image Sil3114 controller
Optical	Sony DW-D22A 16x DVD+/-R, 2.4x DVD+R9, 48x CD-R, Sony DD-1613 DVD-ROM

AUDIO

Soundcard	Creative Labs Sound Blaster Audigy 2 ZS
------------------	---

FINE DETAILS

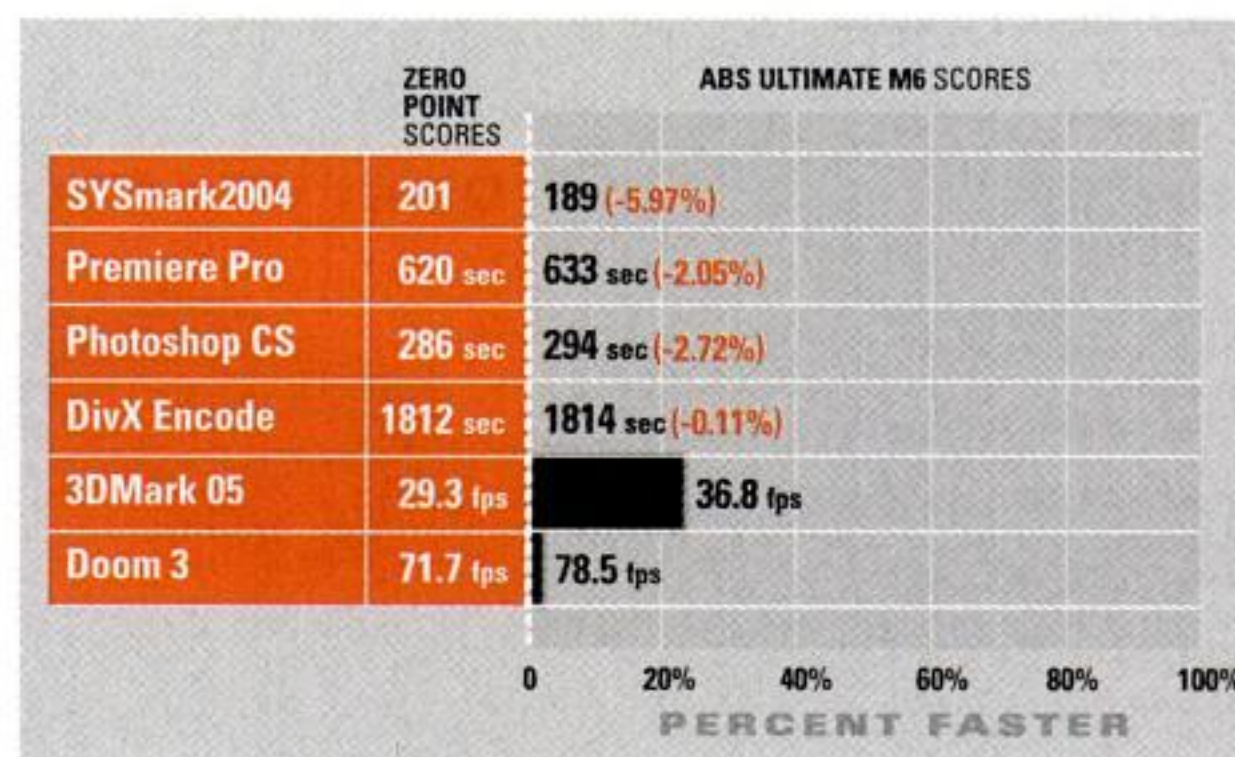
Case	Lian Li PC-V1000, Antec TruePower 550 PSU
Fans/extras	Two 120mm, floppy, wheels

BUNDLE

Windows XP Pro

BOOT: 30 sec.

DOWN: 8 sec.



Our zero-point reference systems uses a 2.6GHz Athlon 64 FX-55, 2GB of DDR400 Crucial Ballistix RAM, two nVidia GeForce 6800 Ultra cards in SLI, a Maxtor 250GB DiamondMax10, a Sound Blaster Audigy 2 ZS, a PC Power and Cooling TurboCool 510 Deluxe Express, and Windows XP Pro with SP2.

MAXIMUM PC VERDICT

9

+ HD

Lowest-priced SLI-equipped rig we've seen.

- TB

Last-gen hard drives and slightly laggy application performance.

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Sonos Digital Music System

Premium home audio streaming, with a price tag to match



Technolust seldom penetrates the jaded, gadget-proof shells that calcify around *Maximum PC* editors, but the Sonos Digital Music System shattered our composure with a massive kung-fu kick. You see, the Sonos system delivers something we've long craved: our entire music library at our fingertips, in every room of our house.

Even better, the Sonos pulls off this trick with minimal wiring and few sonic compromises. Two components work together to make the magic happen: a ZonePlayer module (one for each room you wish to music-ize) and at least one wireless, handheld Sonos Controller. Once you've set up the system, you use the controller to operate any ZonePlayer, either independently or in sync, from anywhere in the house.

The controller is really the star of the Sonos show. Its 3.5-inch color LCD screen tickles our fancy, and the custom interface is extremely easy to navigate. The iPod-style scroll wheel lets you quickly speed through massive music collections, and the backlit buttons make it easy to perform common tasks—such as adjusting the volume or pausing a tune—even in dark rooms (a light sensor turns the backlight on and off).

The interface is intuitive and easy enough for even the most technophobic Luddite to use. Our only gripe with the controller is that its scroll wheel feels twitchier than the iPod's. It can be frustrating to make line-by-line adjustments with the wheel, until you get a feel for it.

CONFIGURE THE SYSTEM

Setup is easy: Connect the first ZonePlayer to your wired network, and then install the configuration utility on your PC. Using the config utility, point the ZonePlayer to the shared folder in which your music is stored. You can also use stand-alone NAS (network-attached storage), such as the Buffalo HD-H250LAN, either in addition to or instead of a PC. Connecting subsequent ZonePlayers is as easy as powering them up, stepping through the wizard on the

remote, and pressing a button on the front of the box.

And this brings us to Sonos' secret sauce. In addition to wired connections, the Sonos devices—including the remote control—communicate using a proprietary flavor of 802.11g. This custom protocol makes it possible to avoid many of the dropped packets and playback hitches associated with streaming media files over Wi-Fi. The upshot is that you need to connect only one ZonePlayer to your wired network; the rest can be daisy-chained using the wireless network.

Connect a PC and you can stream Internet radio to any or all of the ZonePlayers in your home (provided you have a high-speed Internet connection). You can use one of the 70 preset stations, or add your own MP3 streams. Sonos intends to add support for Real's Rhapsody network, too. That promise doesn't factor into today's rating, but when it's fulfilled, Rhapsody subscribers will have access to more than 800,000 *legal* tracks.

AMP IT UP

Sonos designed this system for multi-room installations, which explains the integrated amplifier in each ZonePlayer. But that amp *almost* cost the product a Kick Ass rating.

First, it's rated at just 50 watts per channel (RMS) at 8 ohms, with dynamic range of 20Hz to 20kHz and 0.02-percent THD. Paired with our own Klipsch RF-35 loudspeakers, we found the amp to be just adequate to fill a 450 square-foot room with sound. Second, the amp is redundant if you stream audio to your home stereo system (the unit provides stereo RCA variable-audio outputs *and* a subwoofer output). Sonos should give serious thought to offering a second, less-expensive ZonePlayer model *sans* amp.

The ZonePlayer also provides stereo line-level RCA inputs, which we put to good use streaming the output from a 400-disc CD jukebox to ZonePlayer modules all over the house (the device converts the incoming audio to your choice of WMA or WAV file formats in real



The Sonos Digital Music system is damn near the best streaming-audio rig we've tested to date.

time). We're disappointed, however, that Sonos didn't outfit the ZonePlayer with SPDIF input and output. The spring-loaded speaker-wire binding posts are also a little too Best Buy for our tastes.

SO, HOW DOES IT SOUND?

But enough about specs and design choices. How does this system sound? Color us impressed. Even though the amp is underpowered, output is very clean. Uncompressed WAV files sounded virtually indistinguishable from CD, and compressed sources sounded as good as or better than other players we've tested. We're bummed, however, that Sonos doesn't support any of the lossless-compression formats: FLAC would be ideal, but we'd accept AAC Lossless or WMA Lossless, too.

Good audio gear isn't cheap, and neither is the Sonos. Each ZonePlayer costs \$500 (the amp must contribute a chunk to that price tag), and each controller costs \$400. Those prices don't include speakers, which means you'll spend at least \$1,400 for a two-room setup—if you already have speakers. By contrast, Slim Systems' Squeezebox costs about \$200 a room (plus speakers), and it delivers many of the same features (minus the amp, four-port Ethernet switch, and that oh-so luscious remote).

—WILL SMITH

MAXIMUM PC VERDICT

9

+ RADAR

Awesome remote, great interface, excellent sound quality, and terrific wireless music streaming.

- SONAR

Paying for an underpowered amp you might not even use sucks; very expensive.

\$1,200 for two ZonePlayers + 1 Sonos Controller, www.sonos.com

M-Audio StudioPro 4

Audio accuracy on a budget

If you have a home recording studio, you shouldn't use a subwoofer-based speaker system because it will present an inaccurate representation of what you're creating. What you *should* use is a set of studio monitors, and if you're on a tight budget, you could do a lot worse than M-Audio's StudioPro 4.

Priced at \$200, the StudioPro 4 speakers feature four-inch, coated-paper cone low-frequency drivers, one-inch Mylar cone tweeters, and vented ports in the back. The vinyl-laminated MDF cabinets have a satisfying heft, and they're magnetically shielded. As is typical of studio monitors, there are no grills to color the speaker's output.

The power supply is located in the left cabinet (which eliminates the need for a wall wart or external block), along with an 18-watt per channel amp, which connects to the source with a pair of RCA connectors. Audio is delivered to the right speaker via speaker cable. (M-Audio provides a too-short RCA-to-1/8-inch cable and medium-gauge speaker cable, the bare ends of which are dipped in solder.) Volume control and a headphone jack are also found on the left cabinet.

These are definitely near-field monitors; they sound best when placed so that the top of the woofers are in line with the tops of your ears. Move back more than 30 inches from the speakers, and bass response drops off a cliff and stereo imaging almost collapses. A "mid-boost" switch on the back of the left cabinet very subtly pumps up the midrange frequencies to give the speakers more "throw," but if you're looking for something to fill a room



M-Audio's StudioPro 4 near-field powered monitors are just the ticket for musicians with home recording studios.

with sound, the Studio Pro 4 is not the right choice. Then again, that's not what any near-field monitor is designed to do.

Listening to a bass solo during "Chumba Basement," from the Frank Zappa DVD-Audio disc *Quadiophiliac*, we were impressed that we could detect the unused snare drum's wires vibrating against its bottom head—not that it's exciting to listen to snare-drum wires vibrate, but it *is* exciting to discern that level of detail in a recording. And that's what studio monitors are all about.

—MICHAEL BROWN

MAXIMUM PC VERDICT		8
+ ZAPPA	Clean, accurate audio reproduction.	
- ZAPATISTA	Limited low-end response, inconveniently located power switch.	
\$200, www.m-audio.com		

Klipsch ProMedia Ultra 2.0

They're Klipsch; they must be good, right?

Sometimes, you just have to ask, "What were they thinking?" As in "What was HP thinking when it acquired Compaq?" As in "What was Bill Clinton thinking when he invited Monica Lewinsky to share his cigar?" And as in "What was Klipsch thinking when it decided to offer \$100 speakers?"

Klipsch has a well-earned reputation for making excellent speakers. Its products have never been inexpensive, but for people who really care about audio, cost is not usually top of mind. So when we heard that Klipsch was offering a two-channel system that would retail for just \$99.99, we were intrigued. Had Klipsch discovered some magically new, incredibly inexpensive material from which to fabricate great-sounding speakers?

Our skepticism dissipated when we unpacked the ProMedia Ultra 2.0s. The plastic enclosures are both attractive and substantial, with each housing two 2.5-inch fiber-composite cones, a one-inch polymer tweeter, and a MicroTractix horn behind removable cloth grills. An amplifier in the left enclosure delivers 15 watts (RMS) per channel, which should be plenty of power for speakers this size. Bass and power/volume controls are also on the left cabinet, along with a headphone output and an auxiliary input.

Our first impression, listening to the Blue Man Group's *The Complex* DVD-Audio disc was, "Wow! These sound pretty damn good." We heard a surprising amount of bass, and the dulcimer-like instruments from "Above" positively shimmered. But that first impression vaporized as soon as we put on Paul Thorn's "Fabio & Liberace" (from *Ain't Love Strange*) and cranked the volume past one-quarter. That tune's thumping bass line instantly turned flatulent, and something inside the enclosures themselves began rattling in protest at what the amp was asking the speakers to deliver. Turning down the bass control didn't help matters a whit.

Memo to Klipsch management:
Please leave the cheap-speaker market to those companies with less of a reputation at stake.



We had a similar experience with games. *Half-Life 2*'s audio events sounded fine at low volume, with satisfying explosions and crackling machine-gun fire. But as soon as we cranked things up, everything went to hell. We tried isolating the amp by plugging in a set of headphones, but that only proved the amp was as much of a problem as the speakers themselves.

Whatever Klipsch was thinking when it designed the ProMedia Ultra 2.0s, we hope the sentiment doesn't migrate to the rest of the product line.

—MICHAEL BROWN

MAXIMUM PC VERDICT		4
+ RODEO DRIVE	You can put the Klipsch name on your desk for 100 bucks.	
- RODEO CLOWNS	You'll want a pair of somebody else's speakers to actually listen to.	
\$100, www.klipsch.com		

Olympus m:robe MR-500i Music Player

All dressed up with little to show

The Olympus m:robe MR-500i appeals to your biological instincts so brazenly that it's downright smutty. Think iPod with breast implants. Gaze longingly at the smooth finish. Ogle the luscious touch screen. Before you know it, this digital siren will have slipped your credit card right out of your wallet.

But then you'll wake up the next morning and discover you've been seduced into dropping 500 bucks on a hag of an MP3 player, digital camera, and handheld photo viewer. The 3.7-inch touch screen is a clever innovation, to be sure. It delivers superb image quality, second only to the Epson P-2000, and it controls every function except for Power and Hold. Digital photographs look vivid and utterly exciting; unless you shot them with the MR-500i itself.

Because the MR-500i is nearly devoid of buttons, you must push on the touch screen to snap a photo, and that action invariably jiggles the camera's flush-mounted, fixed focal-length lens and 1.2-megapixel image sensor. We found it nearly impossible to capture a clear image, a problem compounded by the absence of a flash. Although the device sports a 20GB hard drive, it doesn't offer a memory-card slot, rendering it a poor companion for photographers using dedicated digital cameras.

The MR-500i fares better as an MP3 player, delivering sound quality rivaling the LCD's image quality. But it doesn't get as loud as Creative's players, it's much slower than the iPod at scanning and spinning up, and we got less than seven hours of play time before the rechargeable lithium-polymer battery pooped out.

In fact, the list of things this player can't do seems longer than the list of things it can: It won't play video files. You can't copy music to the player



The m:robe is so sexy, you'll be tempted to hide it under the mattress when guests arrive. Maybe it ought to stay there.

through Windows Explorer. Once you've set up the player on one PC, you can't manage it from any other. And although the player supports both MP3 and WMA files, the accompanying PC software will convert CD audio only to WMA format.

On the other hand, that screen really is beautiful. And in Remix mode, you can produce an A/V-club slide show of your digital photos accompanied by your favorite tunes. Considering, however, that even medical marijuana is illegal in the U.S., we're not sure why you'd want to zone out listening to music and watching a tiny slide show for hours on end.

—LOGAN DECKER

MAXIMUM PC VERDICT

4

DISROBED

Fantastic touch screen that looks great, and a foxy cradle.

DEFROCKED

Spirit-crushing camera, poor battery life, and wildly expensive.

\$500, www.olympusamerica.com

Seagate Barracuda 7200.8 400GB

It draws blood, but misses the takedown

It's been all quiet on the Seagate front for more than a year, but the tenacious drive manufacturer is back on the offensive with its new, eighth-generation Barracuda. We recently tested the company's flagship model (ST3400832AS), which delivers a record-tying 400GB capacity, an 8MB buffer, a 7,200rpm spindle speed, a SATA interface, and native command queuing (NCQ).

Although the Barracuda ties Hitachi's 7K400 for the capacity crown, Seagate fits the 400GB onto just three platters; Hitachi's drive uses five. Do the math: The 7200.8 packs 133GB onto each platter. That's the highest areal density available right now. Higher areal density means the read/write heads have to travel less, which should, in turn, increase the drive's overall performance.

That certainly seems to be the case with the 7200.8. During our benchmarking, the Barracuda laid down the fastest average sequential read speeds ever recorded for a 7,200rpm drive, outpacing even the mighty Maxtor DiamondMax 10 (the previous 7,200rpm champ). At 55MB/s, the 7200.8 approaches Raptor territory even—an incredible accomplishment considering that the Raptor



This unit's performance suffers a tad as a result of its 8MB buffer. Seagate says a 16MB version is in the works.

spins its platters at 10,000rpm. Access times were 1 millisecond slower than spec (9ms after subtracting rotational latency), which isn't cause for alarm.

The only area of testing in which the 7200.8 fell short—and it's a big one—was in the real-world benchmark we call the application index: a script of six real-world programs. The Barracuda's score of 24.4 is slightly underwhelming compared with the DiamondMax's record-holding score of 26.6. To Seagate's credit, however, the new drive performed significantly better than the 7200.7 drive we tested back in January 2004. The best score that previous-generation drive could muster was a lowly 19.5. We didn't specifically test the 7200.8's NCQ performance, but previous Lab tests revealed little or no performance boost in a single-user, desktop environment.

Although it posted the fastest read speeds we've ever seen in its class, the 8MB cache is clearly holding this drive back. In fact, if you're in the market for a new hard drive, we'd recommend the less-expensive non-NCQ, parallel-ATA version of this drive (model number ST3400832A). It streets for about \$100 less than the SATA model.

—JOSH NOREM

DARE to COMPARE	7200.8	DiMax
HD TACH 2.61		
Sequential read (MB/s)	55.38	52.23
Burst speed (MB/s)	116	118
Random access (ms)	13.2	15.7
H2BENCHW		
Random access (ms)	13.1	13.5
Burst read (MB/s)	117	123
Sustained read avg. (MB/s)	55.2	51.9
Sustained write avg. (MB/s)	53.9	51.9
Application index *	24.4	26.6
Warranty	5 years	3 years

Best scores are bolded. * Application index is the geometric mean of a drive's performance in six real-world application profiles.

MAXIMUM PC VERDICT

8

AREAL DENSITY

Fast reads, quiet operation, huge capacity, and a killer five-year warranty.

CRANIAL DENSITY

Pricy, performance is held back by a small cache, and NCQ gains for a single-user load are minimal.

\$400, www.seagate.com



PATIENT: 800 303 7866

DIAGNOSIS: HAIRLINE FRACTURE

NOTES:

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NECK SPEEDS.**

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 **VELOCITY**
m i c r o

With a technically superior PC processor, the AMD Athlon™ 64 processor 3500+ with HyperTransport™ technology. The award winning Velocity Micro™ Vision™ FX A/V/D renders digital images at break neck speeds, giving you the ultra performance you expect from Velocity Micro.



PlexWriter PX-716A DVD Burner

Holy smokes! Plextor pulls out all the stops with its best drive ever

Put on your party hat, because if Plextor's PX-716A DVD burner doesn't make you want to get naked and dance a jig, then you're either a hopeless Luddite or dead.

We're not all that surprised the PX-716A turned in a record-breaking time writing 4.25GB to a single-layer DVD+R disc in 5:50 (min:sec); we're accustomed to cutting-edge speeds from Plextor, and that's only a second faster than the results from NEC's much cheaper ND-3500A. What really amazes us is the unprecedented speed with which the PX-716A writes to double-layer media. The PlexWriter broke the 20-minute barrier writing 8.3GB of data to a DVD+R DL disc in just 18:16 (min:sec) by writing at 6x to media rated for 2.4x speed! That's almost triple the media rating, which made us suspicious about the compatibility of the disc with set-top players. Our fears were unfounded—the disc performed essentially the same as DVDs burned by other drives on our five set-top players. The PX-716A even makes rewriting speeds look attractive—we filled a DVD+RW in another record-breaking time of 14:32.

But Plextor drives aren't just about sheer speed. The PX-716A is bundled with Roxio's excellent *Easy Media Creator 7* suite, but the bundled *PlexTools* software is where the real action is. Here's where you have access to a staggering number of options, such as setting the book type for DVD+R/W discs to make them more compatible with set-top players, all the way down to minutiae like tweaking the speed at which the drive tray opens and closes. You also get such familiar Plextor features as GigaRec, which can squeeze up to 1GB on a 700MB disc



The PX-716A is a little frumpy on the outside, but a speed demon on the inside.

(although these discs are readable only on Plextor drives) and the ability to password-protect a disc if you want to burn your diary to CD.

In addition to a drive that can burn a double-layer DVD-Video in less time than it takes to eat a bowl of Top Ramen, you get double-digit access time and even an extra black bezel. This isn't just the best drive Plextor has ever made—we think it's the finest optical drive we've ever held in our hot little hands.

—LOGAN DECKER

MAXIMUM PC VERDICT 10

+ PARTY HATS

Fastest burn speeds ever, unprecedented "over-speed" capability, and features galore.

- DUNCE CAPS

"Plextor" sounds like a bad comic book arch villain.

\$140, www.plextor.com

HomeSeerSE Z-Wave Starter Kit

Home automation gets one step closer to cool

In the *Maximum PC* fantasy home, a computer would control just about every aspect of our environment, with a minimal amount of setup and little or no follow-up intervention. We'd be able to control the system from a touchpad, a PDA via voice commands, or even over the Internet.

After dabbling with the *HomeSeerSE* Z-Wave Starter Kit in a real-world environment, we've concluded that fully automating our homes would be pretty easy, but it would also be pretty expensive. The good news, however, is that we could pull it off without ripping a single wire out of the walls.

The starter kit consists of a Z-Wave USB RF transceiver, *HomeSeerSE* software, a touchpad unit, and a single plug-in lamp module. Additional control modules can be purchased separately (a three-pack of plug-in lamp modules sells for \$108), which takes some of the sting out of automating an entire home.

At the heart of the system are Z-Wave chips, developed by a company called Zensys. These chips are inside the USB transceiver and the touchpad unit, as well as inside the control modules, allowing all to communicate by way of radio frequencies. The technology is mesh-based, which means every device within range of the control module or touchpad receives these broadcast commands and either executes them or passes them on to the next device in the chain until the command reaches its final destination. As long as you have enough control modules deployed, the system can cover an unlimited area, no matter how many physical barriers lie in the signal path.

The *HomeSeerSE* software consists of a web server that enables you to schedule automatic events using your PC. You can even remotely trigger events over the Internet, either by logging into the server or by sending an



The HomeSeer USB transceiver (left) uses Z-Wave technology to automate your entire home.

e-mail message. The SE version supports up to eight Z-Wave modules and up to 32 events. Upgrading to the "full" version of the software (\$150) adds support for an unlimited number of modules and events, and it enables you to control the system using voice recognition, a PDA, or with scripts written in Visual Basic, Java, or Perl.

Zensys is busily signing up other partners to implement its technology. So far, Leviton has signed up to provide lighting controls, Carrier is embedding the technology in its air-conditioning systems, and Wayne Dalton builds it into garage-door openers. Each product is interoperable with the other, so you should be able to mix and match components from any Z-Wave vendor without compatibility worries.

—MICHAEL BROWN

MAXIMUM PC VERDICT 8

+ SEED MONEY

Easy to implement; doesn't rely on a single vendor.

- DEMON SEED

Expensive; technology must be built into some products.

\$200, www.homeseer.com

Olympus C-8080 Wide Zoom

Tank-like construction, SLR-like performance

Weighing in at a hefty pound and a half—without its battery pack and memory card installed—the C-8080 Wide Zoom point-and-shoot digital camera is the Sherman tank in Olympus' crowded motor pool. The rugged, all-metal body construction screams, "Built to last!"

The C-8080's imaging armament—a 2/3-inch, 8-megapixel CCD paired with a 7-35mm (28-140mm, 35mm equivalent) aspherical glass lens—is the perfect match for the camera's well-armored hide. Put the two elements together, and you have an awesome array of firepower in your hands. This camera takes some of the sharpest, most vibrant, high-resolution images we've seen in this class. In fact, you'd be hard-pressed to discern its output from that of low-priced digital SLRs—provided you're shooting in adequate light. Noise, or image grain, can become a significant issue in moderate- to low-light conditions, but that's not uncommon with digital cameras in this class.

The C-8080 scores another direct hit when it comes to ergonomics. We found the body's design immediately comfortable, with most controls within easy—and intuitive—reach. We did find the shutter release to be a little awkward at first, but that's just because it's in a slightly different location than previous C-series cameras.

The camera offers both fully automatic and fully manual shooting modes. The 5x optical zoom lens strikes a nice "all-in-one" balance, with a wide-angle view and solid macro capabilities. Having said that, however, we did find the zoom a trifle hypersensitive; it can be tough to get exactly the right setting.

Storage is handled by xD and CompactFlash media cards, but you'll need an Olympus-branded xD-Picture card to shoot panoramic images. The camera



If still or portrait photography is your bag, the C-8080's in the top tier of advanced point-and-shoots.

stores its images in your choice of RAW, TIFF, or the default JPEG format. QuickTime flicks, with resolution of 640x480, look quite good.

The rechargeable Li-Ion battery provides a generous lifespan in the field (upwards of 400 shots), and the camera springs to life in less than one second. It's a little slow in other respects, though; particularly when writing files to the memory card in RAW or TIFF format. And although the C-8080 can shoot 1.6fps in continuous burst mode, shutter lag rears its ugly head when it comes to moving subjects. If it weren't for this significant criticism, which we think renders the camera unsuitable for action photographers, the C-8080 would be going home with our coveted Kick Ass award. As it stands, its exceptional aptitude for banging out stellar macro and still images earns it a solid 9 verdict. We consider it to be one of the top choices in the advanced point-and-shoot field.

—STEVE KLETT

MAXIMUM PC VERDICT

9

+ NEW ENGLAND PATRIOTS

Excellent image quality; superb macro capabilities; and a rugged, comfortable design.

- PHILADELPHIA EAGLES

Slow write times, twitchy zoom, noise/grain issues in low light and burst mode.

\$900, www.olympus.com

Sapphire Toxic Radeon X700 Pro

Champagne on a beer budget?
Don't count on it

The videocard section in CompUSA is a place of hopes and dreams. Up on the top shelf, ensconced in complex anti-theft packaging, sit the \$500 behemoths. Sadly, the card you can afford lies in an inconspicuous white box on the bottom shelf, unprotected and unloved. Is there a budget videocard worthy of your desire?

There may be a kick-ass \$200 videocard out there someplace, but the PCI Express Toxic X700 Pro isn't it. With a mere eight pipelines and a puny 128-bit memory interface, it's in a different league than higher-priced parts—a much, much lower league. Here's the big problem: To accommodate the Toxic's higher-than-standard clock speeds, Sapphire slapped a two-slot cooler on the board. While this cooler enables Sapphire to clock its board at an impressive 472MHz core/525MHz memory (up from the standard 425MHz/430MHz), it takes up a whopping three slots. That's right kids, a protruding nub on the blue fan inside the housing will touch large PCI cards—an Audigy 2, for example—even two slots over.

We've come to grudgingly accept two-slot cooling solutions at the extreme high end of the



It sure looks fancy, but the Sapphire Toxic Radeon X700 Pro's cooler blocks three slots!

graphics spectrum, but for a \$200 underperforming budget card to eat up three slots in a system is downright ridiculous. Come on, people; this is a bad idea!

Last month we reviewed a comparably priced MSI NX 6600 GT board, which is faster in every benchmark and fills only the single PCI Express slot you mount it in. Couple that with the potential upgradeability you get with the SLI-capable 6600 GT board, and it's clearly a superior offering.

With a better-performing nVidia solution available now, and 12-pipe Radeon X800 XL-based videocards on the horizon at the same price point, the X700-powered card is nothing more than a bad buy.

—WILL SMITH

BENCHMARKS	Sapphire Toxic X700 Pro	MSI NX 6600 GT
3DMark 2005 Default	3,081	3,495
3DMark 2003 Default	7,680	8,650
3DMark 2003 Game 2 - HQ	9.6	13.4
3DMark 2003 Game 4 - HQ	16.3	17.6
Halo 1.06	29.0	113.4
Doom 3 Demo1	14.0	47.2
Far Cry 1.01	39.1	42.6

Best scores are bolded. All benchmarks were run on our Athlon FX-55-powered test system, which includes an Asus nForce4 SLI motherboard and 2GB of DDR SDRAM. All tests were run at 1600x1200, except for 3DMark 2005 and 2003 Default, which were run at the default settings. The wildebeest's top speed is about 50mph.

MAXIMUM PC VERDICT

4

+ RUBY

Comes with Splinter Cell: Pandora Tomorrow.

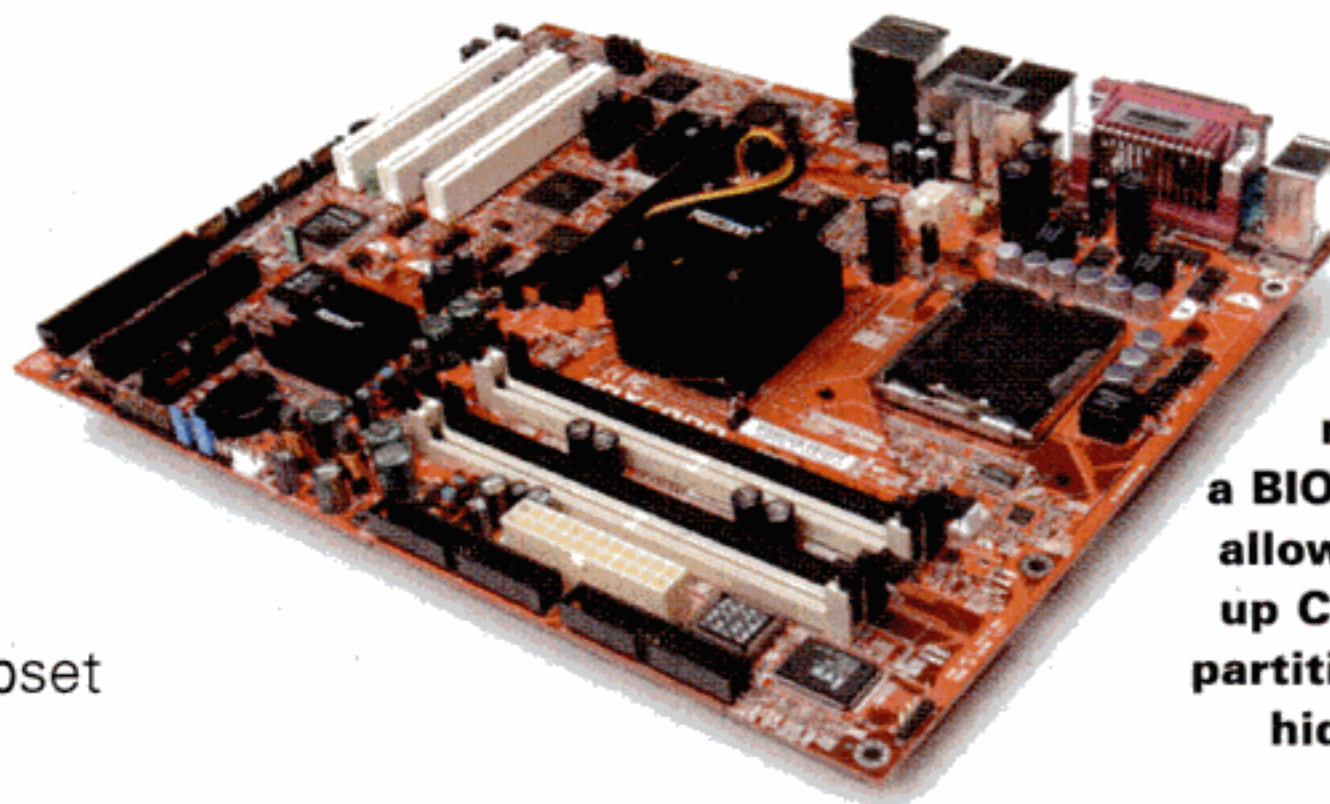
- GARNET

Poor performance and a three-slot card.

\$200, www.sapphiretech.com

Locked and Loaded for the Final P4

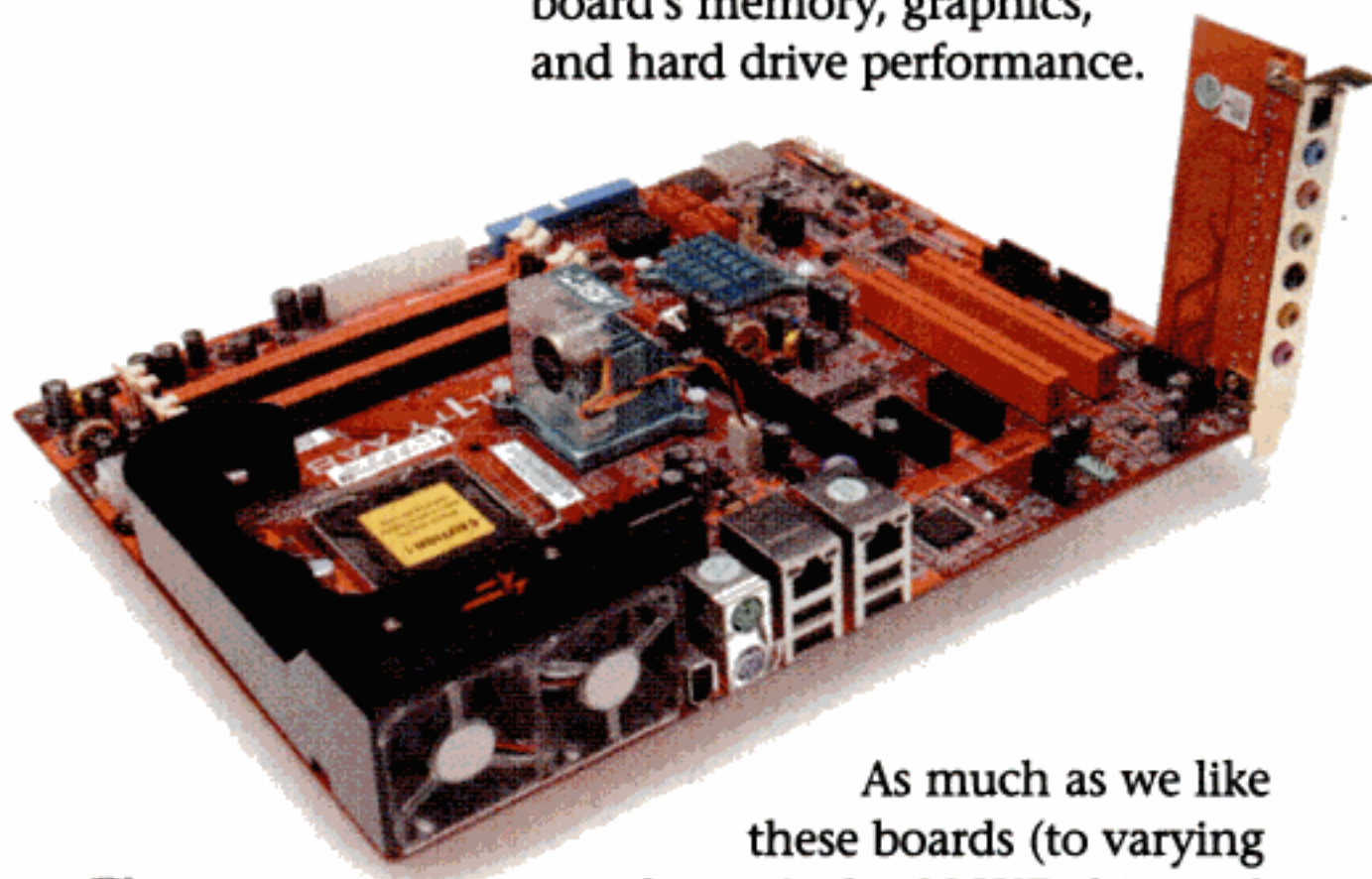
A triple-shot of mobos based on Intel's 925XE chipset



Foxconn's mobo includes a BIOS feature that allows you to back up CMOS data and partition tables to a hidden partition.

If the new 3.73GHz Pentium 4 Extreme Edition is to be the last of the P4s, it might as well go out with a bang. And what a bang it is. This month, we scrutinize three new motherboards using Intel's 925XE chipset, which supports the 1066MHz front-side bus.

To test this triumvirate of Intelism, we used the exact same components with all three mobos: a 3.46GHz Pentium 4 Extreme Edition chip, a GeForce 6800 Ultra video-card, a Western Digital 740GD hard drive, 1GB of Corsair low-latency DDR2/533 memory, and a PC Power and Cooling TurboCool Express PSU. All motherboards were tested with fresh installs of WXP Pro SP2, along with the latest drivers and BIOS from each manufacturer. We ran a series of benchmarks to stress each board's memory, graphics, and hard drive performance.



The Abit AA8XE features a unique audio riser and LED lighting around the perimeter.

As much as we like these boards (to varying degrees), the 925XE chipset they all use remains an unknown quantity in one very important respect: Will it work with dual-core chips? We don't have a clue, and Intel's lips are sealed tighter than Avril Lavigne's jeans.

—GORDON MAH UNG

Abit Fatal1ty AA8XE

If it's possible for George Foreman to devise a mean, lean, fat-burning machine, than it shouldn't be much of a stretch for the world's greatest video game player to design a lean, mean, gaming mobo, should it?

We can't picture Jonathan "Fatal1ty" Wendel standing over a PCB and popping in TSOPs by hand, but Wendel says he did have a lot of input in the design of the AA8XE board.

Some of the features are classic Abit, including the dual outside thermal-exhaust system (OTES). The OTES features two system-controlled fans and heatsinks, which directly vent heat from the board's voltage regulators and processor outside the case. Pretty smart. Wendel's design influence is apparent in the LEDs that wash the bottom of the mobo in a menacing red glow.

The fans that clip onto the memory modules are a little gimmicky, but they could help cool things down inside a cramped case. The handy power and reset buttons located on the board are better features. These can be really useful when troubleshooting the board while it's outside the case. Combined with the integrated two-digit LED that gives you POST-code info, it should simplify diagnosing booting issues.

You'll encounter this board's most controversial element when you examine its I/O specs: The AA8XE is practically stripped. In Abit's marketing materials, Wendel tells potential customers that "features gamers don't use were removed from the board, freeing up performance and allowing us to add features you would actually use." While it's true that poorly implemented "extras" only add to overhead, a feature that's useless to one person will likely be essential to someone else. While the other two boards reviewed here offer dual Gigabit LAN connections, the AA8XE delivers only a Gigabit/Fast Ethernet combo. The other two boards also offer twice as many SATA connectors and three times the PATA ports. Clearly, storage freaks should look elsewhere.

We do appreciate the consideration Wendel and Abit paid to audio: The AA8XE uses a riser card for all

its audio connectors; theoretically, this helps decrease interference from the motherboard. The next logical step would be to get the CODEC off the board completely, but this is a good start. The board's support for Dolby Digital Live is also a plus. This real-time encoding technology can convert any audio signal into a 5.1-channel Dolby Digital stream and output it to a SPDIF connector.

In our performance tests, the AA8XE did well after we properly set the clocks on the processor. By default, the AA8XE overclocked our 3.46GHz P4EE chip to 3.53GHz. Such minor overclocking should run fine, but for our tests, we manually clocked the chip back to stock speed for a level playing field. Still, that Abit feels confident enough to OC out of the box is a good sign. All things being equal (save the mysteriously fast Asus board), the AA8XE is about what you'd expect from a 925XE motherboard that isn't overclocked.

Having said that, we realize the board is intended as an overclocker's gaming motherboard and nothing else, but we also know that most builders (including us) would pass it over for a part that offers far more storage options.

FATAL1TY AA8XE

MAXIMUMPC VERDICT

8

+ GEORGE FOREMAN

OTES and an audio riser card make the board unique.

- ERIC FOREMAN

Not enough SATA; too few fan headers.

\$250, www.abit-usa.com

Foxconn 925XE7AA-8EKRS2

You can always tell when a company accustomed to selling to OEMs enters the consumer space: It forgets to give its product a name you can pick out on a store shelf. Take Foxconn's

925XE7AA-8EKRS2: Is this motherboard the love-child of TK-421 and THX-1138, or what?

Foxconn isn't a new company, of course; in fact, it's one of the leading suppliers of motherboards to OEMs. It's only just now wetting its big toe in the consumer-motherboard Jacuzzi, and it shows.

At first glance, the 925XE7AA-8EKRS2—oh, hell, let's just call it the '7AA—is pretty impressive. In the features break-dance challenge, the '7AA is among the best motherboards we've ever tested. The Asus P5AD2-E Premium is the only board that manages to out-feature it: The '7AA has dual Gigabit Ethernet, FireWire A and B, and three RAID controllers. Looking for more? How about a super-fast boot process and a nifty means of backing up the CMOS data, partition table, or entire partitions to a hidden partition from inside the BIOS.

Of the three boards reviewed here, the '7AA also has the best expansion-slot arrangement. Even with a chunky two-slot graphics card installed, the '7AA gives you access to two x1 PCI Express slots and three PCI slots. The Asus board gives you two x1 PCI-E slots, but just two PCI slots while hosting a two-slot graphics card; the Abit board provides just a single x1 PCI-E slot and two PCI slots in the same situation.

In terms of performance, the '7AA is top-notch, scoring on par with Abit's board. Still, neither board matches the Asus. (As a general rule, you shouldn't expect a whole lot of variation among Intel chipset-based mobos.)

Despite an overall good impression, we have some issues with the design. First, the board's CMOS reset jumper is placed right next to a jumper that helps you recover from aborted BIOS updates. Neither jumper is clearly labeled, so you'll need to know the difference between a JP4 and JP5. The BIOS is pretty good, but the overclocking and RAM-timing screens felt a little too "OEM" for us. Finally, the '7AA is the only board of the three that doesn't come with drivers for real-time Dolby Digital encoding. That's a shame.

Foxconn hasn't stumbled in its first steps in the consumer pool, but it's not making any waves, either. The '7AA delivers top-notch performance, but it's out-featured by Asus and out-blinded by Abit. The other two boards are more appealing to overclockers, too. So who is the '7AA

for? We think it's best-suited to the system builder who wants a board with OEM-like reliability, but that delivers more features than any Intel-branded board.

925XE7AA-8EKRS2

MAXIMUM PC VERDICT **8**

+ FORMULA 409
Tons of SATA and PATA ports, FireWire B, and a good expansion-slot arrangement.

- FORMULA 51
CMOS jumper is poorly labeled, RAM arms are too close to the graphics slot, and no Dolby Digital.

\$225, www.foxconnchannel.com

ASUS P5AD2-E Premium

Maximum PC readers will find the P5AD2-E Premium strikingly similar to the motherboard we used in last year's Dream Machine. That's because it's pretty much the same board, except this one supports CPUs with a 1066MHz front-side bus.

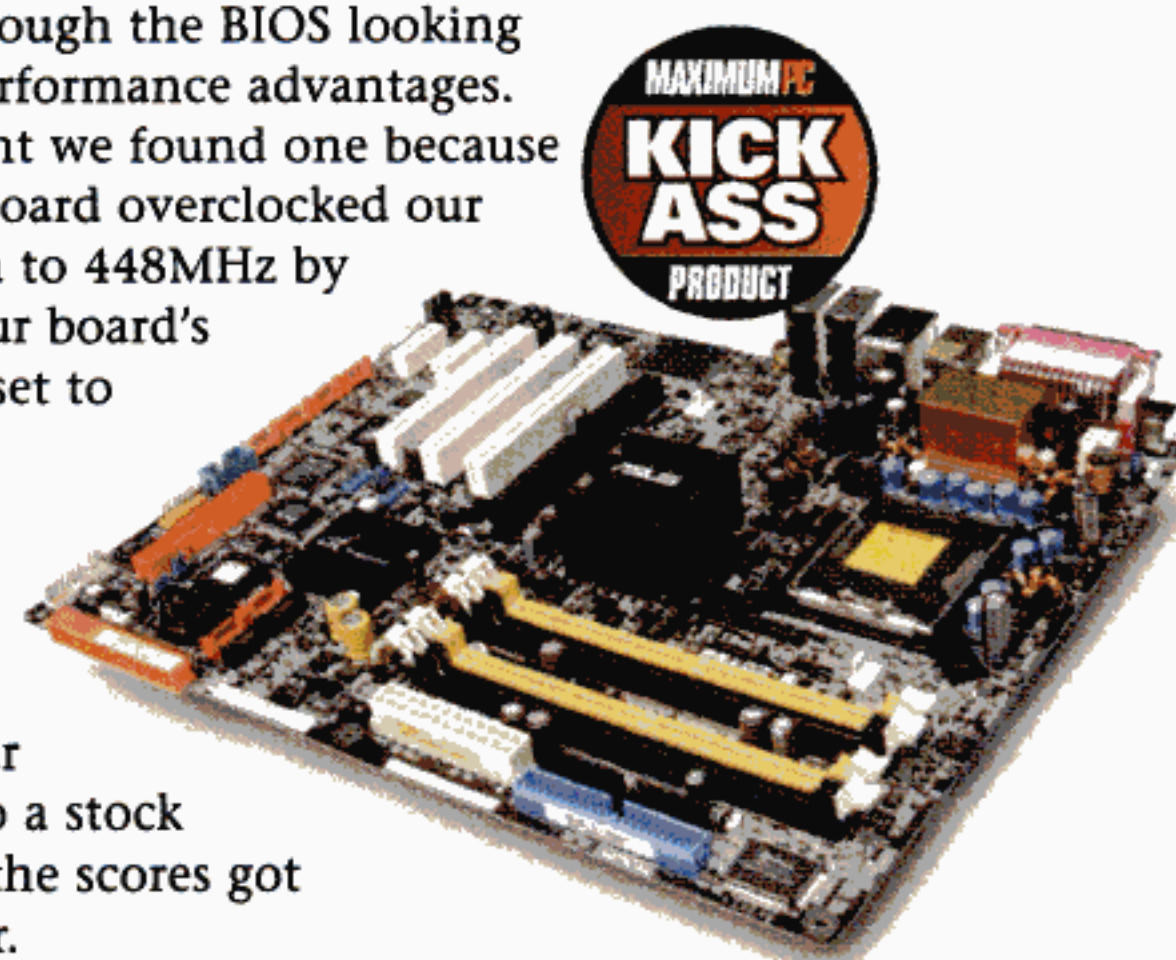
And that ain't a bad thing, really. Like its illustrious predecessor, the P5AD2-E is a traveling ASIC salesman's dream: It packs dual Gigabit, FireWire A and B, eight SATA ports, three PATA ports, onboard 802.11B/G support, and Dolby Digital Live. The P5AD2-E is the only one to include three free fan headers; the others provide just one. Asus also bundles an external SATA connector that lets you run up to two SATA drives outside your computer. Nifty. In fact, the P5AD2-E is so packed with goodies that we can't think of anything to add—unless, that is, we could have the 925XE chipset magically support SLI.

OK, maybe we can think of a few other things. As we mentioned elsewhere in this roundup, Asus would benefit from a more pragmatic approach to expansion ports. As it stands, you must sacrifice a PCI slot to run a double-slot graphics card. Because we probably won't see useful PCI-E add-in cards for another 12 months, we'd rather sacrifice the second PCI-E slot (as the Abit and Foxconn boards do). We also find the 12V power plug a little inconvenient. It's no deal breaker, but you'll find yourself cursing the engineer's ancestors while trying to wedge this board into a tight case. These are minor points, though, and Asus' design choice will be vindicated if x1 PCI-E cards become the norm RSN.

You might recall that the introduction of the original P5AD2 fostered some controversy: It was fast, motherboard manufacturer Gigabyte cried foul and accused Asus of cheating. With that in mind, we closely examined the bus speeds and clock speeds on all three boards. With FSBs manually set to 266MHz, the Abit was slightly underclocked at 3462MHz, the Foxconn hit a perfect 3466, and the Asus was overclocked by 6MHz at 3472MHz—obviously not enough to really matter. We also picked through the BIOS looking for any performance advantages. We thought we found one because the Asus board overclocked our 6800 Ultra to 448MHz by default (our board's BIOS was set to 435MHz). But when we disabled the feature and set our GeForce to a stock 425MHz, the scores got even faster.

We couldn't determine precisely where the performance jolt came from, but there was a common denominator. In most graphics and memory tests, we found the P5AD2-E a few ticks faster than the others. We're not talking 10 percent, but a consistent 1-to-3 percent.

So where does that leave the P5AD2-E? It's the fastest board here, and it has the most features. In our book, that makes it the clear winner in this trio.



Asus pulls performance out of the ether to trounce the competition

P5AD2-E Premium

MAXIMUM PC VERDICT **9**

+ ODD JOB
Features aplenty and good performance.

- JAWS
Poorly placed 12V connector; and by default, it overclocked the nuts off our videocard.

\$240, www.asus.com

BENCHMARKS	Abit	Foxconn	Asus
Sandra 2004 RAM Composite	5,685	5,785	6,084
3DMark2001 SE OV	24,128	24,004	24,142
3DBench MB/s	792	813	814
PCMark 2004 OV	5,601	5,593	5,629
PCM CPU	5,324	5,290	5,355
PCM RAM	5,998	5,977	6,192
PCM Graphics	7,125	7,126	7,123
PCM HD	5,593	5,556	5,564
Quake III "Normal"	525.6	527	540
AquaMark OV	70,442	70,454	71,573
AquaMark GPU	10,326	10,326	10,416
AquaMark CPU	11,086	11,077	11,419
HD Tach 3 Burst	120MB/s	120MB/s	120MB/s
HD Tach 3 AVG Read	65MB/s	65MB/s	65MB/s

Best scores are bolded.

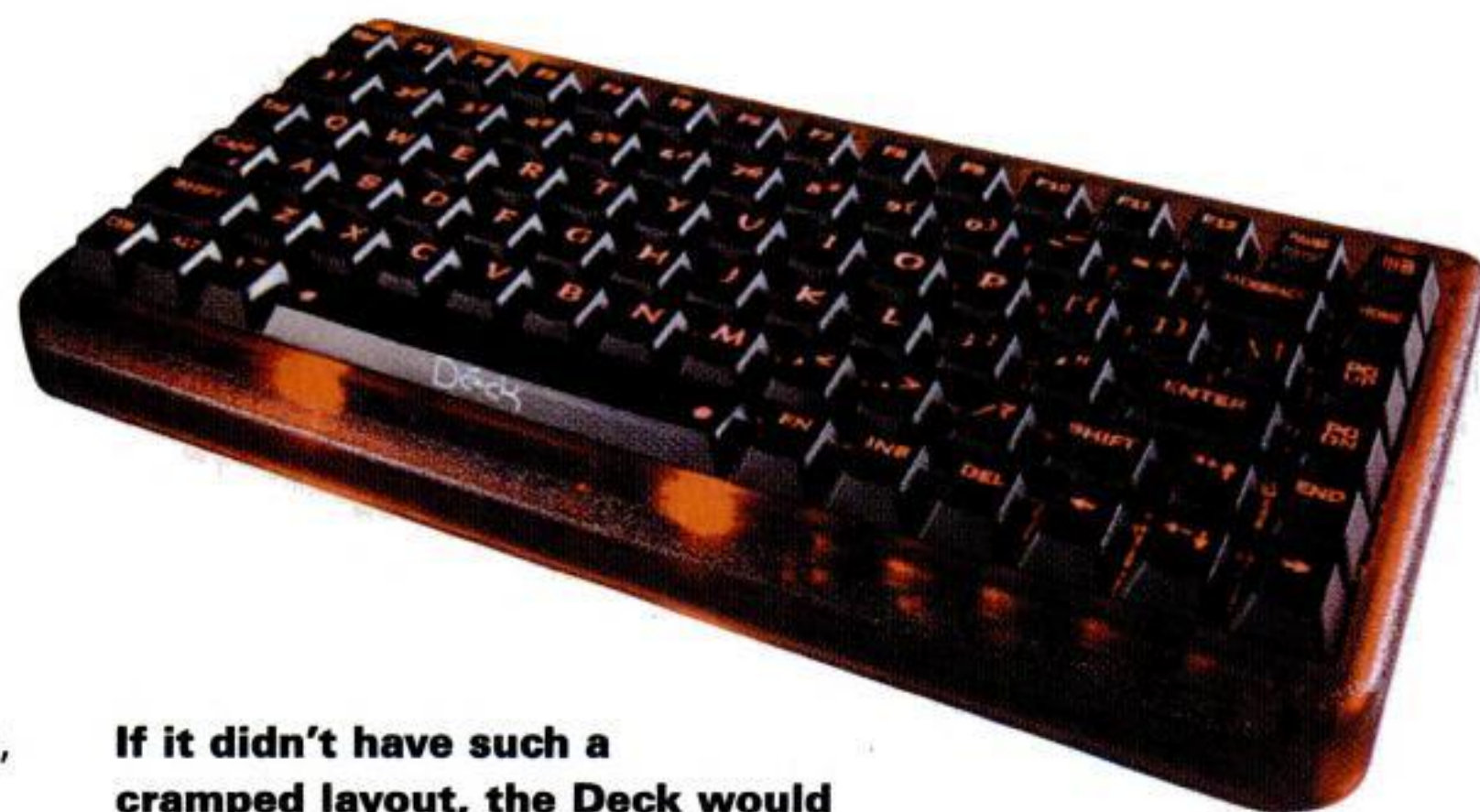
Deck BL82 Illuminated Keyboard

A little-bit pretty, a whole-lot uncomfortable

We love a good illuminated keyboard. We sure wish someone would make one. TG3's latest Deck looks like a contender. It sports individually illuminated keys, extremely satisfying action, and a design ripped straight from a highway-patrol cruiser. That's right, the USB BL82 is based on the same chassis as many of the keyboards used in squad cars and emergency-response vehicles.

Knowing its heritage, we figured the Deck would be coffee- and donut-proof. It's not. Nonetheless, it's the sturdiest keyboard we've tested in years. The hard plastic chassis and diamond-plate underbelly prove it's built to last. The manufacturer encourages modding, too, although we're skeptical of the claim that modded keyboards are still covered under warranty, as long as the mod is "of proper workmanship." (Potential buyers should also be aware that mods will void the keyboard's 30-day money-back guarantee.)

But flashy looks and sturdy construction don't add up to much if the keyboard doesn't deliver on its primary function, and after using the BL82 for just a few minutes, we concluded that few cops are touch typists. Because the BL82 was originally designed to work in a small area, it uses an incredibly condensed QWERTY layout, with extra keys strewn willy-nilly around the keyboard. Not only are the Home and End keys in odd places, but the modifier keys—Ctrl and Alt—aren't where you'd expect them, either. This means touch typists will have to relearn common keyboard shortcuts.



If it didn't have such a cramped layout, the Deck would be the perfect illuminated keyboard.

The cramped layout is particularly disappointing because we love this 'board's key action. Pressing any of the keys requires a deliberate effort, which is rewarded with a meaty click. For editors familiar with the king of all keyboards, the device that shipped with the original IBM PS/2, the clicky BL82 evokes fond memories. But this isn't the right keyboard for anyone wanting a quiet computing experience. The clickiness we find appealing is bound to irritate light sleepers.

There's really no reason the BL82 couldn't sport a standard full-size key layout. With a standard 104-key layout, this would have been a strong Kick Ass award contender. As it stands, it's barely an also-ran.

—WILL SMITH

MAXIMUM PC VERDICT		4
+	DIAMOND PLATE	Sturdy design and great lighting.
-	FUZZY TOILET SEAT COVERS	Too cramped to use on a daily basis.
		\$100, www.deckkeyboards.com

Multipod 5-in-1

It slices, it dices

Now that USB flash memory drives are a dime-a-dozen commodity, it should come as no surprise that someone figured out how to cram a bunch of new functions into the same formfactor. It should also come as no surprise that such a gadget wouldn't perform any one function particularly well.

We'll cut Octave Systems a great deal of slack on that score, however, because the company has managed to cram a digital camera, a digital video recorder, a webcam, a digital audio recorder, and 128MB of flash memory into a package that's about the size of a pack of chewing gum. And the whole shebang sells for just 150 bucks, including a case.

But it's the digital video-recorder feature that makes the Multipod more than the technological equivalent of a stupid pet trick. Press its "snap" button once, and the tiny device will record full-motion video and sound for up to 12 minutes, or until you press the button a second time. It records video with 640x480 resolution at just over 23fps, while simultaneously capturing monophonic audio with 8-bit resolution at an 11kHz sampling rate—crude, to be sure, but effective nonetheless.

Videos hosted on Octave's website demonstrate the wide range of applications customers have found for the Multipod, including strapping it to a remote-controlled model airplane, and taping it to a set of goggles for a you're-in-the-game view of a squash tournament. The device is small enough—and cheap enough—that it can go just about anywhere.

In an era when even inexpensive digital cameras are routinely packing 2-, 3-, and 4-megapixel image sensors, the Multipod's 307,200-pixel image sensor is almost laughable. Paired with a 4.5mm fixed focal-



Who needs a camera phone? The Multipod 5-in-1 is small enough and cheap enough that it can go just about anywhere.

length lens with an f2.8 aperture, it can capture not-too-grainy 640x480 still images in JPEG format; provided lighting conditions are optimal (there's no built-in flash). Octave includes a nifty bendable USB cable that holds the device in a fixed position whenever you use it as a webcam.

The Multipod can also function as a digital voice recorder, for those times when it's more convenient to dictate your thoughts than write them down. As with the video recording, audio is recorded with 8-bit resolution and an 11kHz sampling rate. Devoid of a built-in speaker, you'll need to plug the doodad into your computer to play back or view anything you capture.

—MICHAEL BROWN

MAXIMUM PC VERDICT		7
+	SPYCAMS	Packs four A/V functions into a USB memory device.
-	SPYWARE	Videos, photos, and audio are all low-res; uses USB 1.1 interface.
		\$150, www.octave.com

Sunbeam Transformer

More than meets the... ah, never mind

No, this case does not transform into anything. It's a standard ATX case that doesn't turn into a robotic beetle or a rolling caisson. Still, it's a heck of a case in its own right, blending aspects of large, burly server enclosures with those of smaller, LAN-oriented cases into a surprisingly cool mixture.

The Transformer is what we'd call a three-quarter size chassis, fabricated from steel and sporting a plastic bezel. It's bigger than a mid-size, but smaller than a full-size. The only glaring deficiency is the use of cheap metal slats to cover the PCI expansion slots, which must be busted out and tossed before you can drop in a card.

The case is entirely tool-less, so the only time you'll need a screwdriver is while installing the motherboard. There's no motherboard tray, but the case is large enough that you don't really need one. The Transformer comes with the finest drive-mounting rails we've seen. They snap firmly onto the drives and lock into place without fuss. You can store extra rails in a nifty removable toolbox inside the case's drive bay—an innovation that speaks to the alpha male in us all. USB and audio jacks are mounted on top of the case—the perfect location.

The case's cooling capabilities approach overkill: You'll find no fewer than four fans—one 120mm fan, three 80mm LED fans, and an empty 120mm tool-less fan bay in front of the hard drive cage. With all four fans running, this case is L-O-U-D. The noise level subsided considerably after we unplugged the two fans on the door, but we lost the lighting effects and extra cooling.



There's no power supply, but the Transformer does include such fun doodads as a glimmering cathode light, three LED fans, a locking case door, and an interior toolbox.

Whether you love or hate the Transformer's luminescence and growling exhaust signature, there's a surprisingly well-made case underneath that flashy exterior; one that even old fogies like us can appreciate.

—JOSH NOREM

MAXIMUMPC VERDICT 8

+ AUTOBOTS

Generous cooling, solid construction, and totally roomy.

- DECEPTICONS

Very heavy when full, and the backplate is made of cheap metal.

\$100, www.sunbeamtech.com

VMWare Workstation 4.5

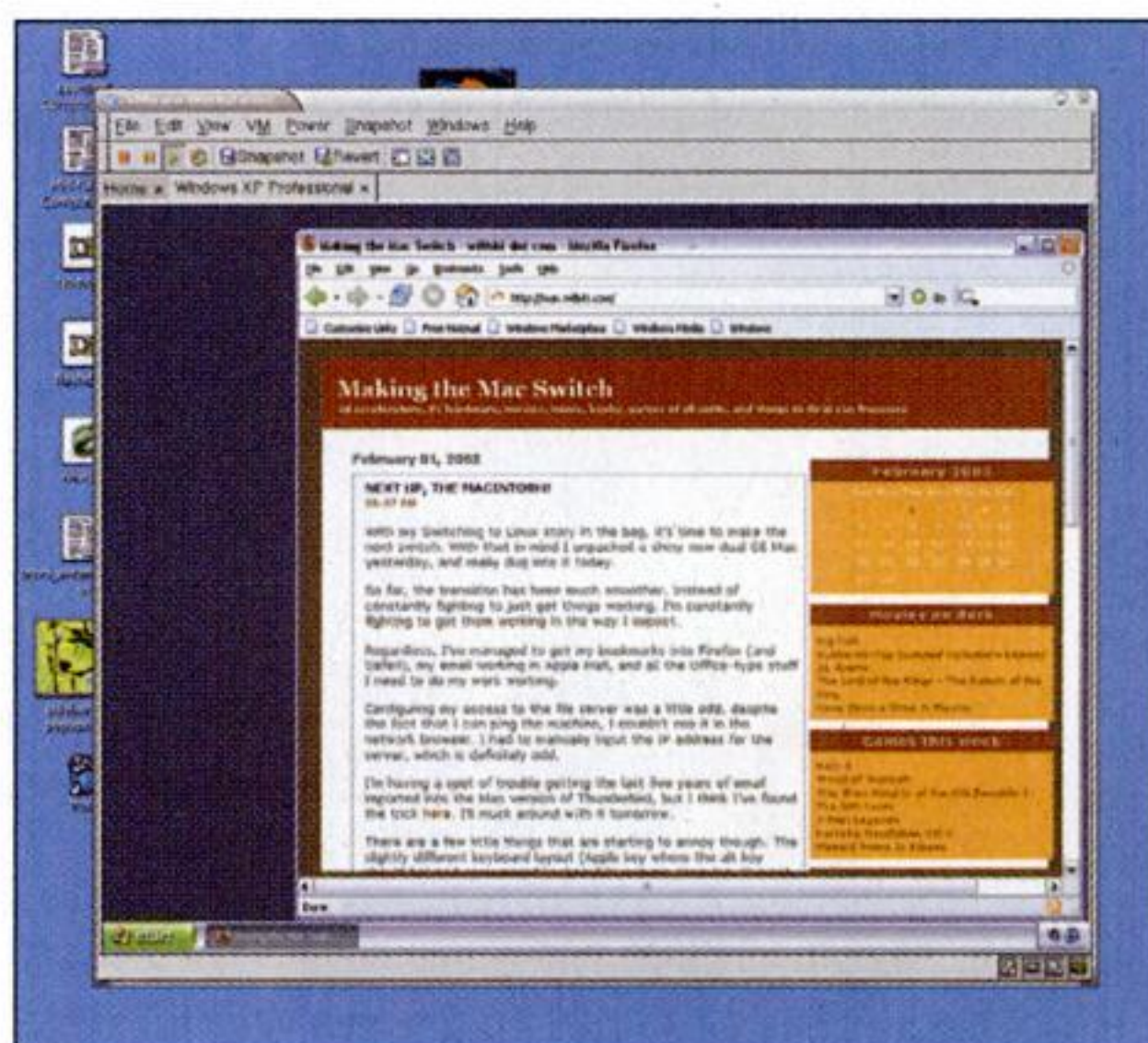
Screw dual-booting! Virtual machines let you run as many x86-compatible OSes you want—without reboots

Running multiple operating systems on one machine is a royal pain in the tuchas. Just when you get everything working, Windows overwrites the boot sector of your primary hard drive and suddenly you can't boot into Linux. Then you start all over again.... What's a PC enthusiast to do? Stick with just one OS? Use a slow, unstable emulator? Fortunately, *VMWare* offers a better alternative.

Unlike emulators, which translate function calls from the emulated operating system into a language your primary OS can speak, *VMWare* creates a separate virtual machine for each OS you install, and then gives that OS full access to your machine's hardware. Instead of running your native OS at full speed and your emulated OS at a crawl, this virtualized hardware lets you run both operating systems at damn near full speed.

To add a second OS to your machine, you first need to set up a new virtual machine. *VMWare* comes with several wizards that make the setup process painless; when you're done, you install the operating system just like normal. It really is that simple. Repeat these steps for as many OSes as you want to run (and have hard disk space to accommodate).

Once the OS is running, you can use it just as you would if it were the only operating system on the PC. *VMWare* will even grant the virtual machine access to your network connection, optical drives, and USB devices. You can also record "snapshots" of each OS. The snapshot is essentially an image of the drive at a specific point in time. If you do something stupid and bork your OS, you can restore it



It's an operating system in a window! If you'd like to run multiple OSes, but don't want to fool with dual-booting, give *VMWare* a try.

in a flash by reverting to the last snapshot.

We have a few minor complaints about *VMWare*. It didn't handle sound well on either of the host platforms we tested (Windows XP and Linux), for one thing. It's also crucial that you shut down the virtual machine properly. If you simply close the *VMWare* window, you might corrupt the files it uses to store the second OS. These flaws are minor, however, and they do little to detract from this software's incredible usefulness.

—WILL SMITH

MAXIMUMPC VERDICT 9

+ REALITY

Ultra-convenient for anyone who frequently uses multiple operating systems.

- VIRTUALITY

Too expensive for casual users. The weird sound artifacts suck.

\$190, www.vmware.com

Star Wars: Republic Commando

Halo + Metroid Prime + Call of Duty

The only entertaining element of the *Star Wars* movie prequels is the climactic battle in *Episode 2*. The sight of thousands of clones attacking a massive droid army boils our noodle. *Republic Commando* puts you in the space-boots of an elite clone commando. Your mission: Defeat the Republic's enemies with the help of your clone "brothers."

Sounds pretty good, right? The game is surprisingly fun, despite the simplistic enemy and squad AI. The level design makes excellent use of the *Unreal* engine, with high-resolution textures, lots of destructible geometry, and objects you can use for cover damn-near everywhere. The animation is extremely good,



We especially like the addition of melee combat, a la *Halo*. If you're running low on ammo, just charge the baddie and whack him in the face.

with none of the skating models that seem to plague many other *Unreal*-based games. We especially dig the varied explosions: Grenades and rockets explode with a flourish.

Republic Commando gives you slightly more control over your squad than other action-oriented squad-based games, such as *Call of Duty*. We're not talking about *Rainbow 6*-style micromanagement, mind you; instead, you issue more



In *Republic Commando*, you issue duties to your squad by assigning them to locations where they can snipe, throw grenades, or use heavy weapons.

general commands that your squad mates follow blindly. In addition to basic commands such as "go there" and "form up," you can give more explicit orders at certain spots—such as "snipe from here" or "chuck grenades at the baddies."

Unfortunately, you can't issue these commands from just anywhere. You can only tell a soldier to snipe from predetermined locations, and you can only tell a soldier to use anti-armor weapons at anti-armor objects. The problem is that these objects usually appear outwardly identical, with only an icon on your HUD to differentiate them. Even more disappointing, the squad AI is so dumb that soldiers always use their default blaster, unless you've specifically ordered them to use something else. Square off against a giant armored robot, and the soldiers will just plink away at it with inaccurate, fast-firing rifles when they should be using anti-armor weapons.

The secret to *Republic Commando* is using your squad effectively. In early levels of the game, you're usually limited to one or two squad-placement spots in a room. As you advance, each room will have multiple spots and you'll need to use the correct ones—with interlocking fields of fire—to succeed. This game mechanic sounds goofy, but it's actually quite fun because it forces you to take a tactical view of each encounter.

Our main gripe with *Republic Commando* is the droid dispenser. These car-size containers show up with increasing frequency as you progress in the game. Each dispenser spits out a never-ending supply of one type of droid, usually quite quickly. The dispensers are impervious to handheld weapons; the only way to destroy one is for a soldier to run up to it and plant a demolition charge. For the 20 seconds it takes to plant the charge, the rest of the squad has to keep the never-ending stream of droids at bay. This is fun right up to the point that two or three droid dispensers appear in a room and start spitting out droids faster than you can kill them. And then it devolves into chaos.

Despite the dim AI and the relentless waves of enemies, the game is quite fun—and altogether too short at 10 hours. We're looking forward to the next installment.

—WILL SMITH

MAXIMUM PC VERDICT
8

STORMTROOPERS

Great graphics, fun gameplay, and interesting encounters.

CLONETROOPERS

Dumb AI, and infinite hordes of enemies.

\$50, www.lucasarts.com, ESRB rating: T

Playboy: The Mansion

Skimps on clothes, and on fun

As huge fans of *The Sims* franchise, as well as of the female form, we figured any game that could blend these disparate elements into an interesting mixture of business simulation and exhibitionism would be pretty decent. Boy, were we wrong.

In *Playboy: The Mansion* you fill the slippers of "The Hef," a man who needs no introduction. Your job as a budding mogul of the adult-publishing world is to help him build his empire, starting with the very first issue of *Playboy*. You must recruit a centerfold, hire a reporter to write stories, befriend luminaries to write essays, and find celebrities to interview. Sounds pretty boring, right? It is, but the game becomes beyond-cheesy when you score a centerfold or cover shoot. You select the model's outfit, and more importantly, remove it altogether for the photo shoot. Then you get to control the camera, so you can zoom in on her points of interest, change her pose, and direct her in all sorts of sultry positions. This is the game's payoff, and it's desperately lacking.

When you're not trying to rotate the camera's controls with your free hand, you're back to the boring part, which is basically playing an extremely unintuitive, tedious version of *The Sims*. Although the game's menus are easy enough to figure out, the personal-relationship aspect is utterly baffling. When you begin talking to a person, a *Sims*-like menu pops up with icons and bars that reveal the extent of a character's various traits. But what the hell does the martini-glass icon represent? Or the one that looks like a stock ticker? We could never figure out how to meet people's needs, or even fulfill The Hef's. We were surprised that a game that features this much gratuitous nudity could be so utterly boring.

The game also suffers from several bugs that make it constantly crash



In *Playboy: The Mansion*, Hugh Hefner builds his empire by networking at parties and marketing female flesh.

to the desktop. But, this might actually be considered a plus. After three hours spent at *Playboy: The Mansion*, we found ourselves looking forward to the sweet release of a crash.

—JOSH NOREM

MAXIMUM PC VERDICT

2

+ PLAYBOY

A crash-to-the-desktop bug saves you from playing for very long.

- WORKBOY

Over-emphasis on nudity at the expense of intuitive design.

\$40, www.playhef.com, ESRB rating: M

Scrabble Online

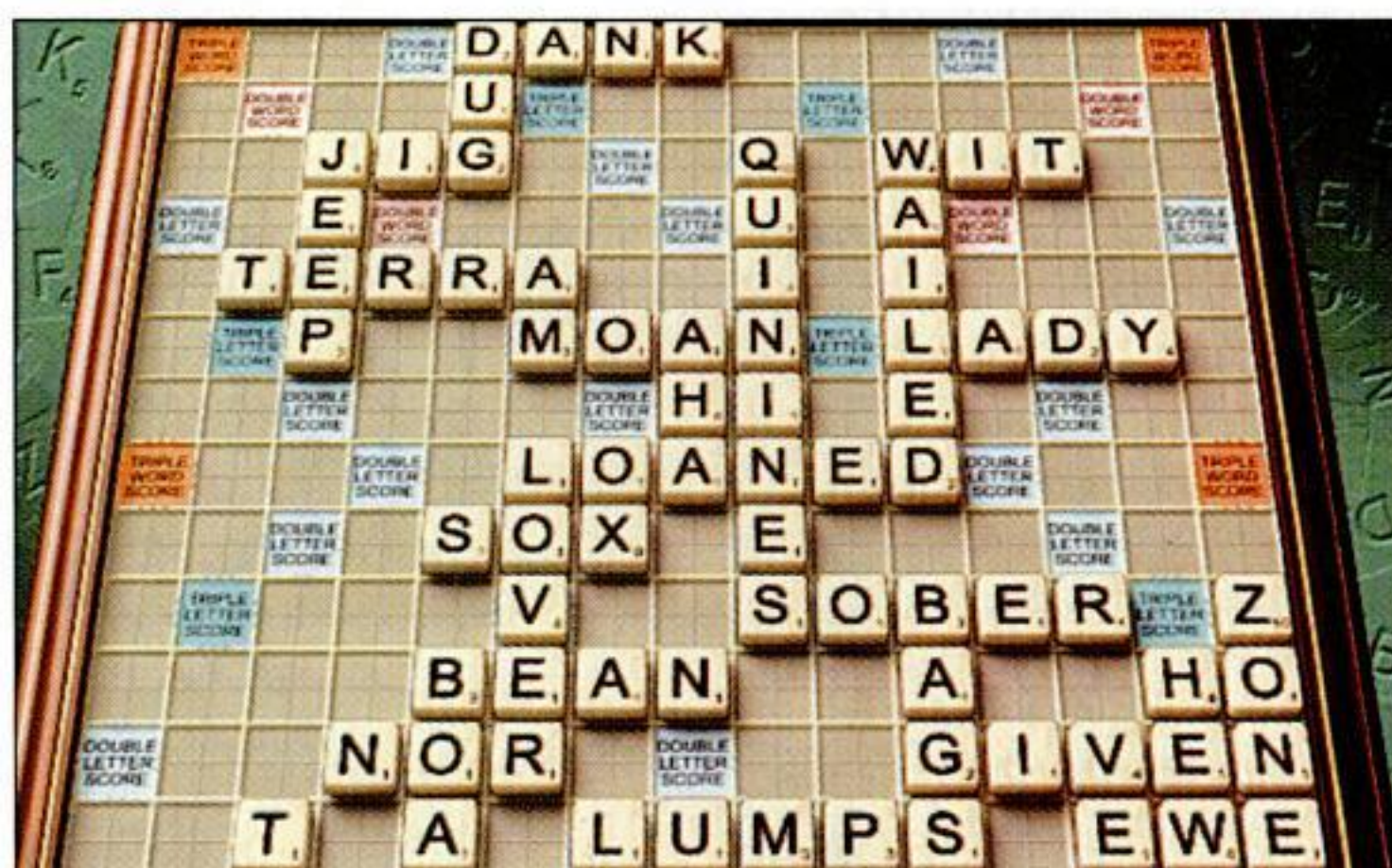
Embrace vocabulary deathmatch

Scrabble: the game of kings. Or is that chess? No matter, because it's still a hoot, and now that the classic board game has arrived on the PC, we just had to give it a crack.

As *Scrabble* maniacs, we're pleased to report that the digital version has plenty to offer fans of the brain-busting original. Along with standard matches against an omniscient computer AI, you can go online to find matches and play several mini-games that help you hone your spelling skills. The computer will even analyze your game and report back exactly how much you suck. It's a well-rounded package, especially considering the price—a measly \$20.

Most users will appreciate *Scrabble Online* for the practice matches against the computer. When you go up against AI, there's no waiting for your opponent to take its turn—a computer is expeditious. You, on the other hand, can ponder word possibilities to your heart's content (unless you play the optional timed game). You can even access a computer-generated list of words that can be made with your tiles (great for learning new words and/or cheating). Or you can take cheating to an entirely new level by making liberal use of the game's built-in dictionary.

Once you're good enough, or have had enough to drink, you can go online to battle it out with anonymous partners over the Internet. Matches are made via the Gamespy Arcade service (www.gamespyarcade.com), which is newbie-friendly, but still problematic. We were unable to create a new account via the game's interface, for example; we had to go to Gamespy's site, create the account, and then go back to the game to log in. Once we logged in to look for a server, we were shocked that the lobbies weren't packed with *Scrabble*-mad housewives clamoring for some action. Is no one hot for *Scrabble* in this day and age?



Scrabble Online's AI ranges from "Beginner" to "Deity," with Beginner using words such as "cat," and Deity making words such as "australopithecus."

When you can't find a match online, you can play *Scrabble* via e-mail with any of your friends who also own the game, or you can play in real time over a LAN. There's always a game waiting, but it's a shame that the least impressive part of the game is its online aspect, since that's this title's selling point.

—JOSH NOREM

MAXIMUM PC VERDICT

7

+ TRIPLE-WORD SCORE

Just like the board game, but without the wait; lots of helpful content.

- EXCHANGING TILES

Hard to find a match online, built-in dictionary is too tempting.

\$20, www.atari.com, ESRB rating: E

Small Games, Big Fun

Features Editor Logan Decker give these four independent games the Maximum PC Seal of Approval

Gish

When your girlfriend's been kidnapped and the only way to get her back is by barrel-rolling through 30-plus levels of hazards and hostiles, you know you're in a platformer. But GarageGames puts a new spin on the classic, side-scrolling adventure with spookily realistic physics and 12 pounds of sticky tar named Gish. Who—or what—is Gish? Why it's a blob that can climb walls, squeeze through crevices, ooze, and firm up at will. Shoveling out tons of "a-ha!" moments when you stumble upon novel ways to fling your bulk over chasms and through obstacles, *Gish* is the most fun to be found in any shapeless blob this side of Rosie O'Donnell.

Platform: PC

- ➕ **GROGS:** Entertaining levels and tons of extras.
- ➖ **TROGS:** It's still, well, just a ball of goo.

MAXIMUM PC VERDICT: 8

\$20, www.garagegames.com, not rated



RocketBowling

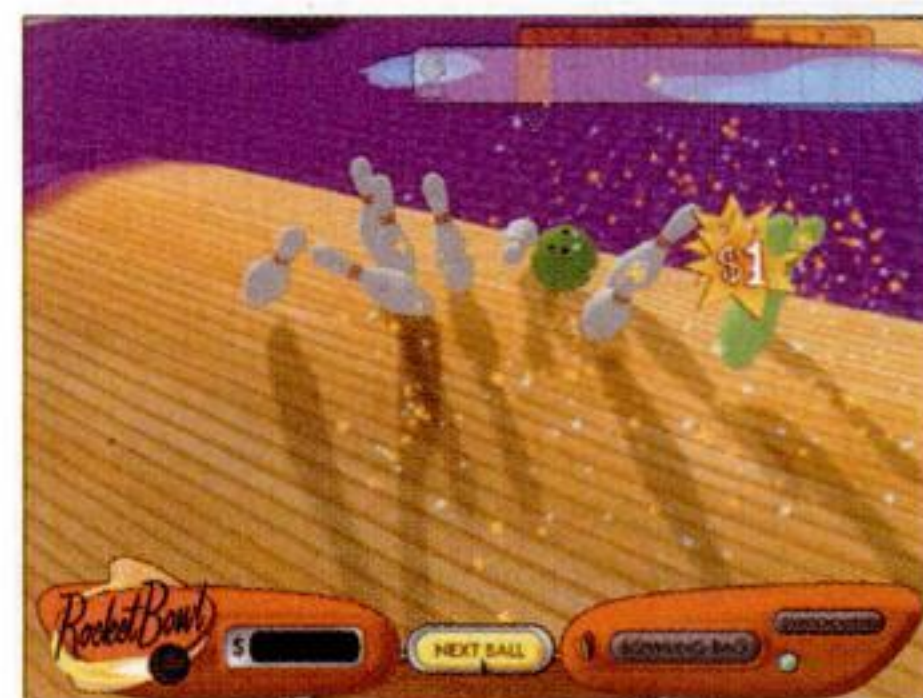
These aren't the lanes you remember from the decrepit strip-mall bowling alley. Put a strategic spin on a single throw and you'll traverse bridges, bowl over steep banks, avoid water traps, and dodge score-busting lane-surface warps. Rack up the dough in tournaments and you can upgrade your bowling ball with aft, port, and starboard thrusters for that extra *umph* you'll need to avoid gutterballs on even the lumpiest of lanes. Combining tournament bowling with miniature-golf wackiness, *RocketBowling* is a fitting tribute to the finest of mid-century American leisure culture.

Platform: PC

- ➕ **BOWLING LANES:** Coolest twist on PC bowling we've ever seen.
- ➖ **BOARDING PLANES:** Only seven courses.

MAXIMUM PC VERDICT: 7

\$20, www.largeanimal.com, not rated



Solterra

We knew it was inevitable that someone would create a Pocket PC game that requires a graphics accelerator. But we didn't expect it to be a meaty space-shooter reminiscent of *Wing Commander*. Sure, the models are fairly simple, but flying around space knocking bogies out of the sky is a helluva lot more fun than mashing sprites with some lame mustachioed plumber. There are 14 levels and multiple boss enemies, with the fun leavened with just a dash of frustration. This is a big leap forward for Pocket PC gaming, but bear in mind that you must have Intel's 2700G graphics accelerator, and that's currently available only in Dell's x50v.

Platform: Pocket PC (Intel's 2700G graphics accelerator required)

- ➕ **STOGIES:** Cutting-edge graphics in a white-knuckle shooter for PDAs.
- ➖ **BOGIES:** Aiming can be dodgy; considerable clipping.

MAXIMUM PC VERDICT: 8

\$25, www.blacksmithstudios.com, not rated



Hamsterball Gold

If you had a hamster as a kid, you surely remember how much fun it was to watch your little furry friend in his "liberty ball," that is, until he took a sudden turn toward the stairs. Now

you can relive those moments of feverish anticipation in *Hamsterball Gold*, a game that demands a responsive mouse and lightning reflexes to navigate ramps, overpasses, traps, and hairpin turns throughout 12 increasingly brutal levels of action. Making the goal is only the first step—beating your previous time on each level will put sweat on your brow. At 15 bucks, *Hamsterball Gold* is a whole lot cheaper than replacing a real hamster after a mishap.

Platform: PC

- ➕ **RODENTIA:** Hopelessly addictive, utterly cute, no shocking death animations.
- ➖ **DEMENTIA:** Multiplayer lacks LAN support; uses the keyboard.

MAXIMUM PC VERDICT: 7

\$15, www.raptisoft.com, not rated



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AMD Athlon™ 64 4000+ (939) \$643.00
AMD Athlon™ 64 3000+ (90nm) \$149.00
AMD Athlon™ 64 3200+ (90nm) \$194.00
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AMD Athlon™ 64 FX-55 (939) \$828.00



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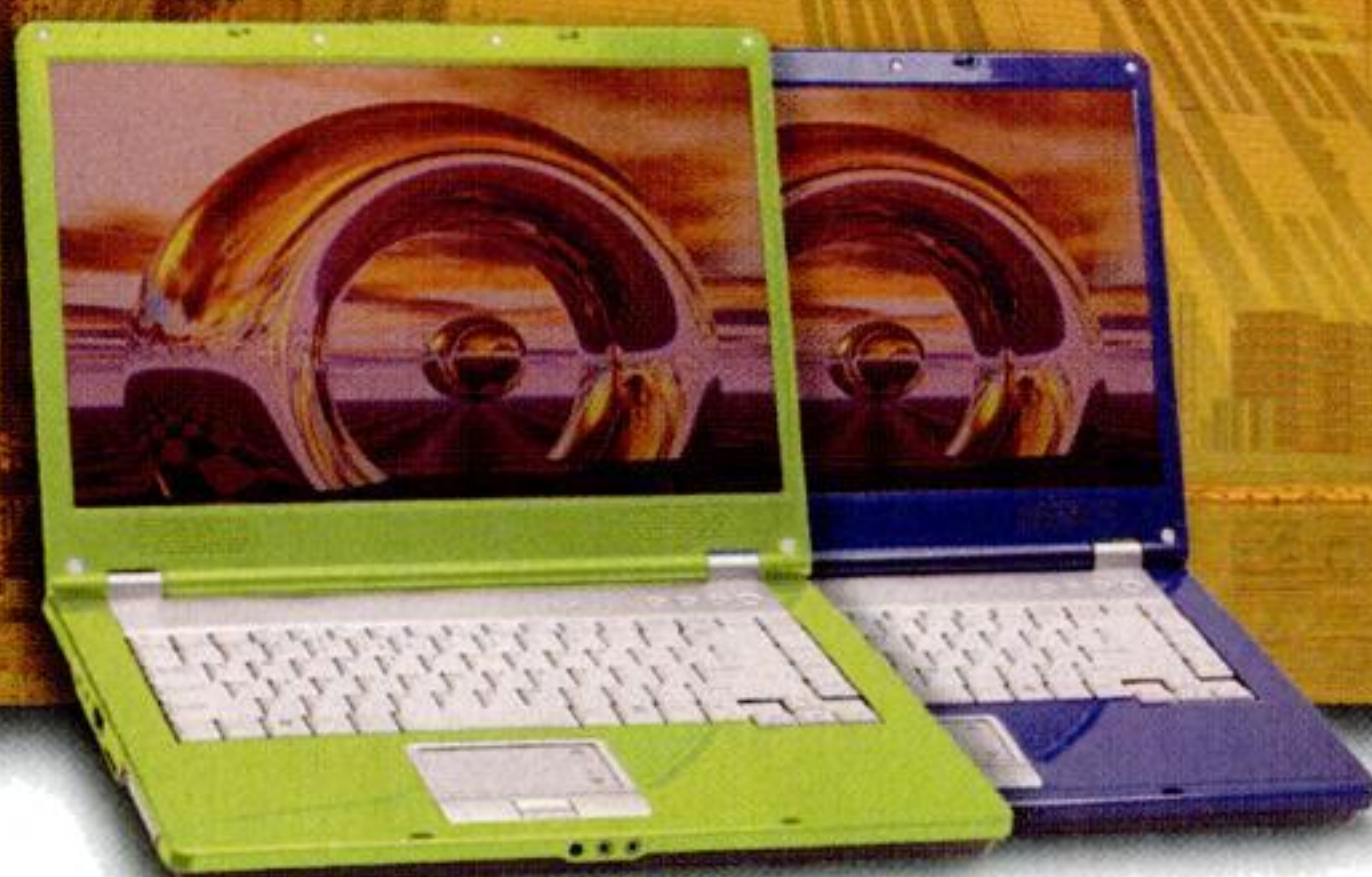


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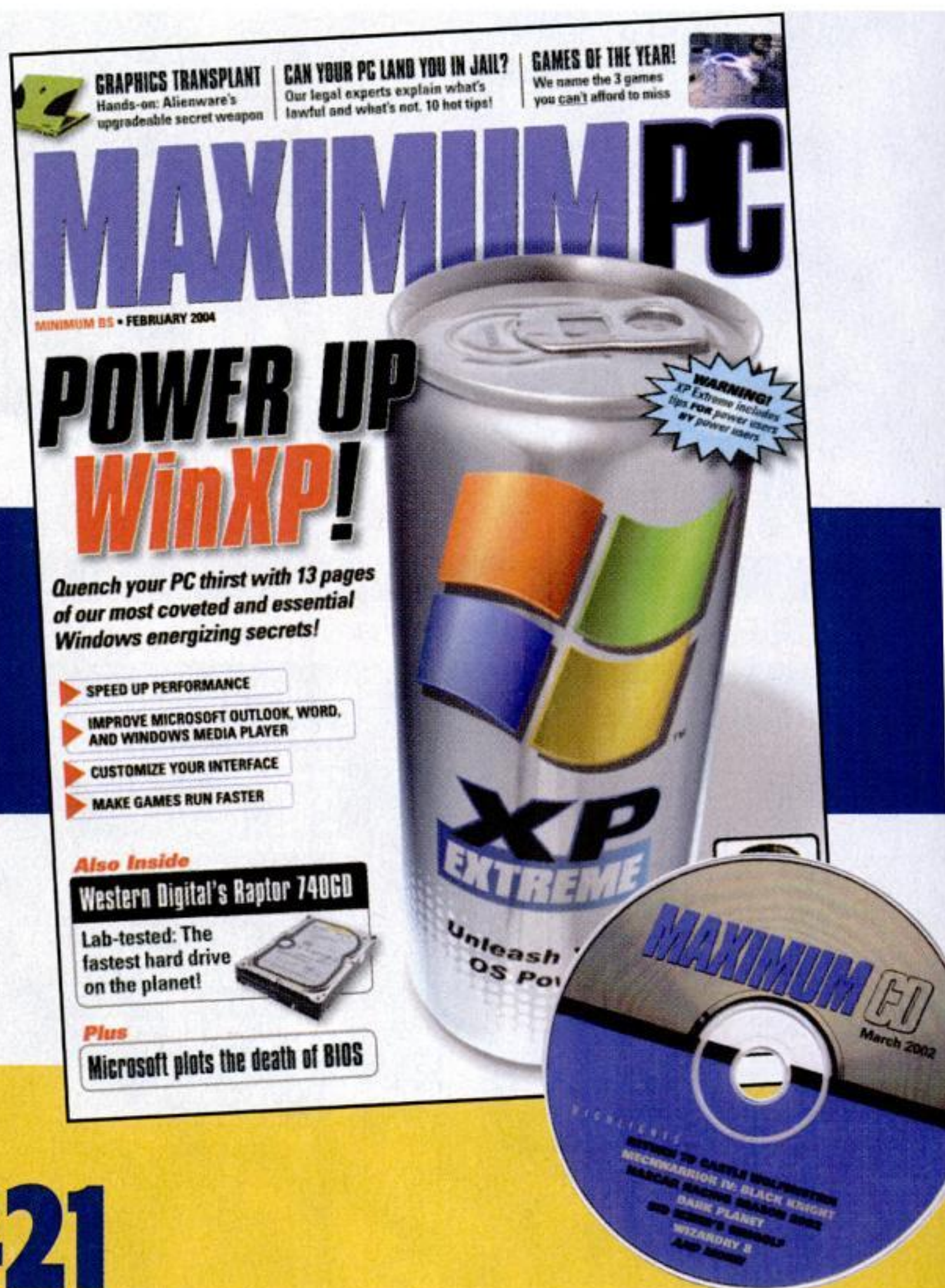
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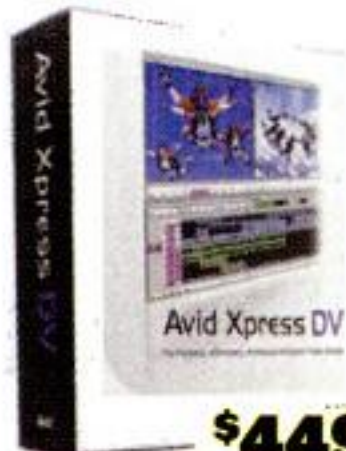
Sonic DVDIt 5 is simple, intuitive DVD authoring software that lets users create professional-quality DVDs on their desktops. Whether it's archiving movies, burning corporate presentations to disc, or creating a sleek video & sound package for an independent director's first film, DVDIt 5 brings Hollywood-quality tools to every video enthusiast. With DVDIt 5, users will find the tools they need to create DVDs as unique as they are. New features includes a more intuitive user interface, advanced object alignment controls, complex navigation controls like "First Play," "End Action" and more

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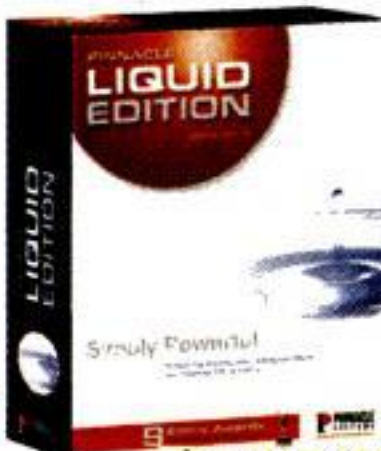


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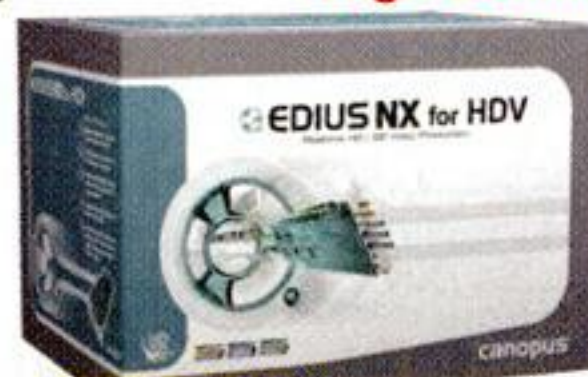
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canopus

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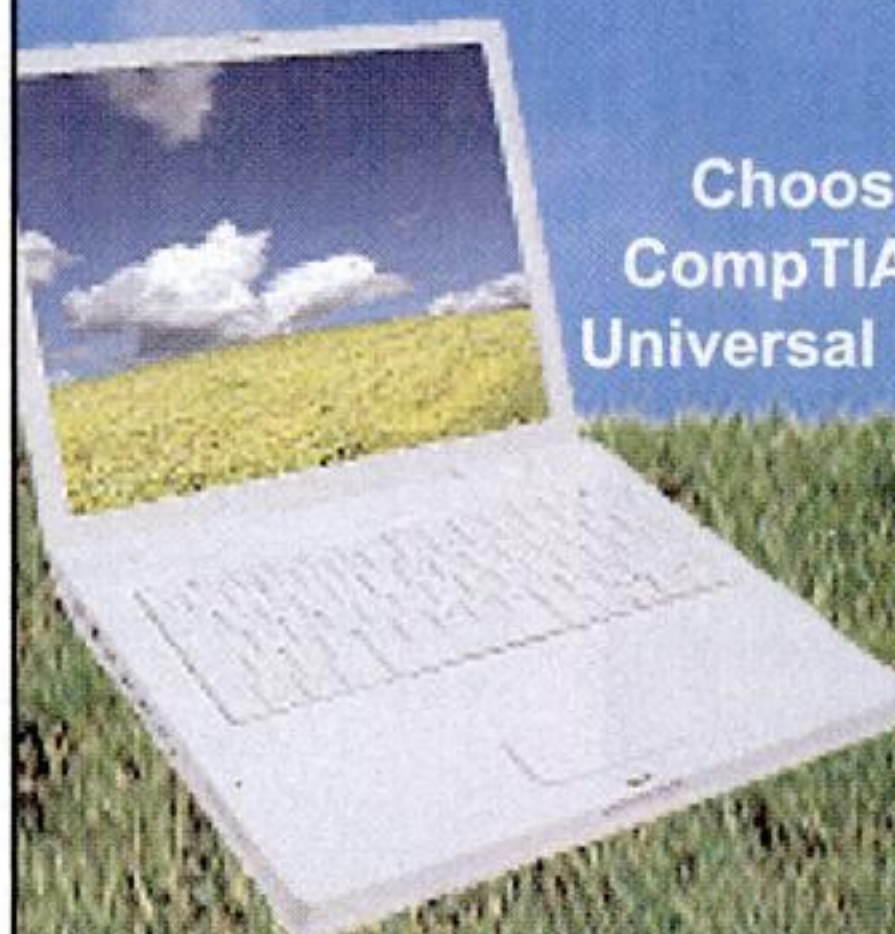
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MAXIMUMPC Rig of the Month

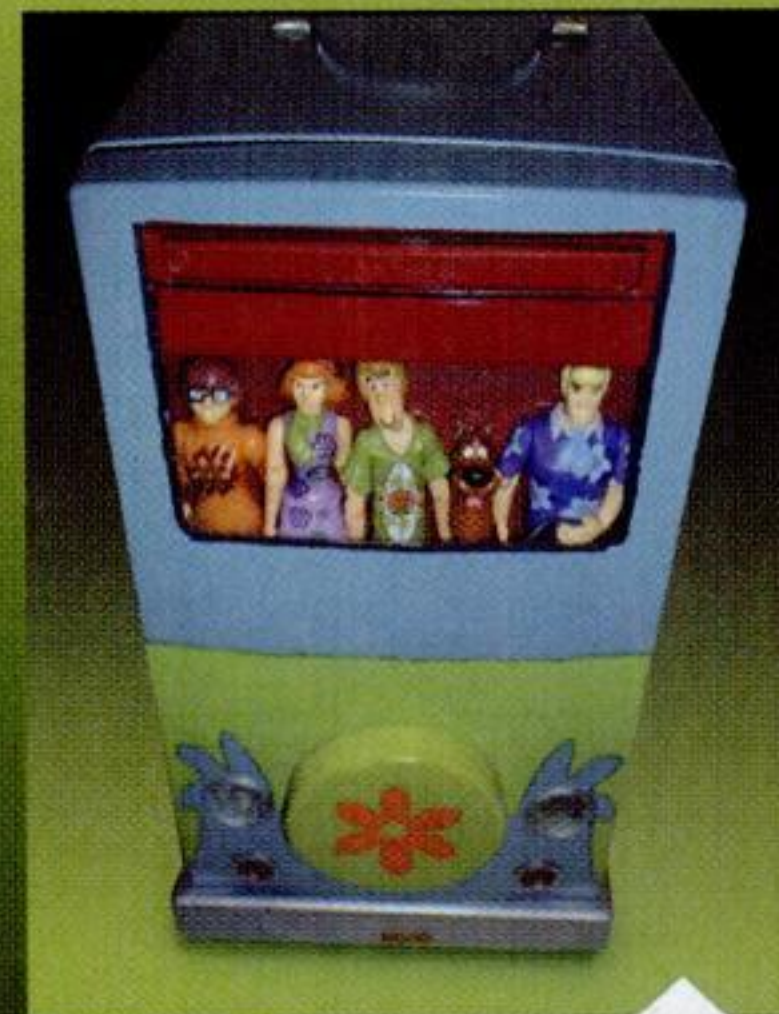
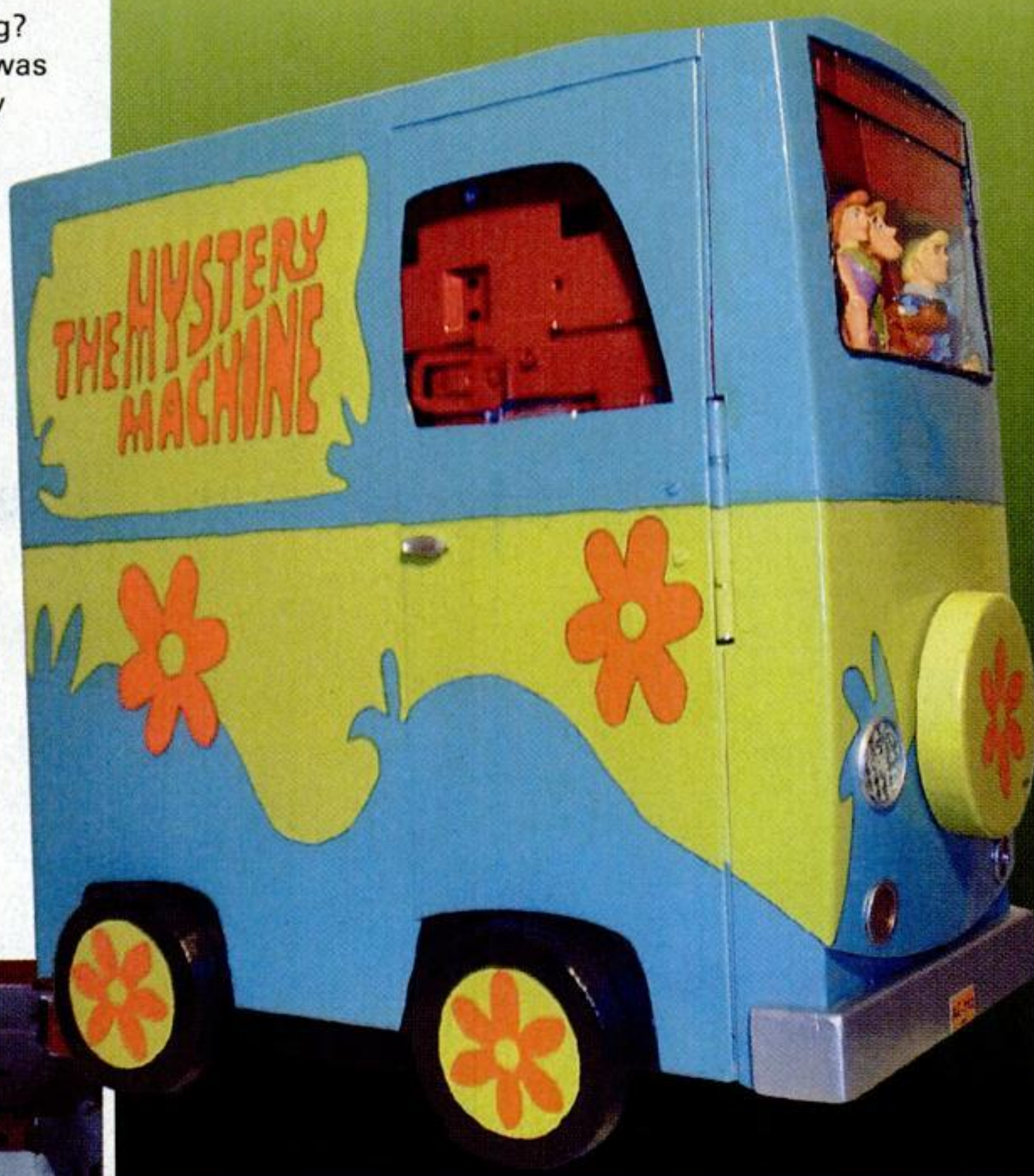
Oh, to be the offspring of a modding enthusiast.... How else could two preschoolers come to possess such a pimpin' rig?

The Mystery Machine was Kristofer Brozio's birthday gift to his kids when they turned three- and four-years old, respectively. The seasoned case-customizer would never personally settle for a plain-Jane or prefabbed computer, so why should his children?

For inspiration, Brozio looked to one of the kids' favorite toys, and then replicated it on a much, *much* larger scale, with obvious loving detail.

All in all, the project took about 100 hours of work, and needless to say, the tykes love it!

THIS MONTH: Kristofer Brozio's Mystery Machine



Brozio chose to do all the van's design work by hand, eschewing spray cans and templates in order to achieve an authentic '70s-style, cartoony aesthetic.

The wheels are made from wooden Christmas ornaments that Brozio bought at a crafts store, and then shaped and painted just so.

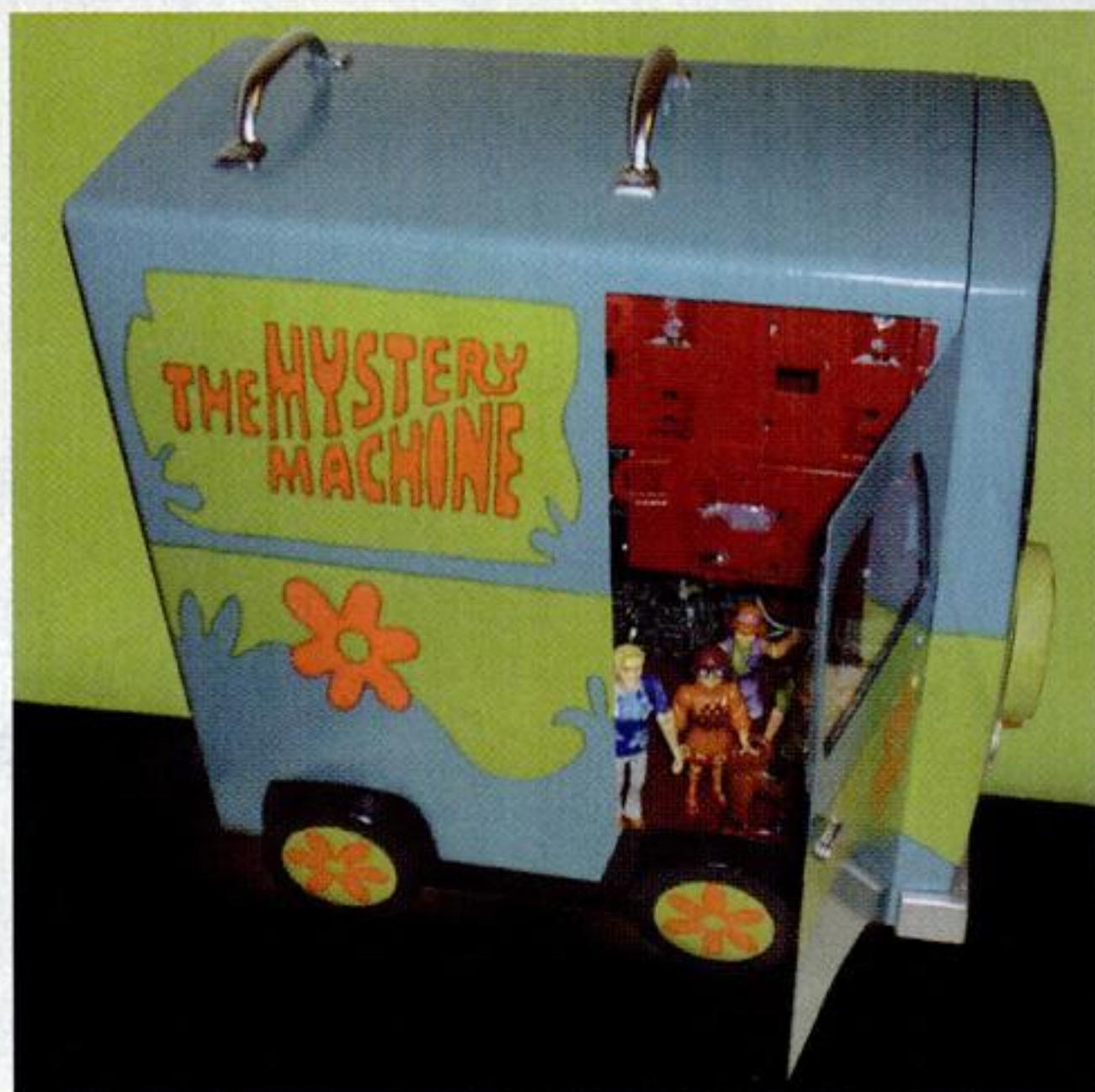


Always up for an adventure, Scooby and the gang see what's doin' under the hood.



The left headlight is the power button, and the right is the CD eject switch (Brozio had to take apart the drive and solder wires to pull off that trick!).

The swing-out door was Brozio's biggest challenge. In the end, he went with a "hidden" hinge taken from an old bi-fold door.



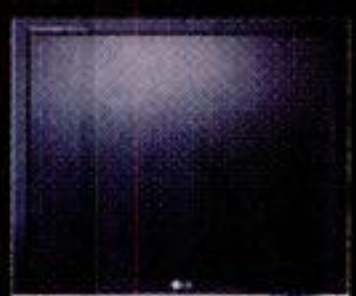
If you have a contender for Rig of the Month, e-mail input@maximumpc.com with high-res digital pics and a 300-word write-up.

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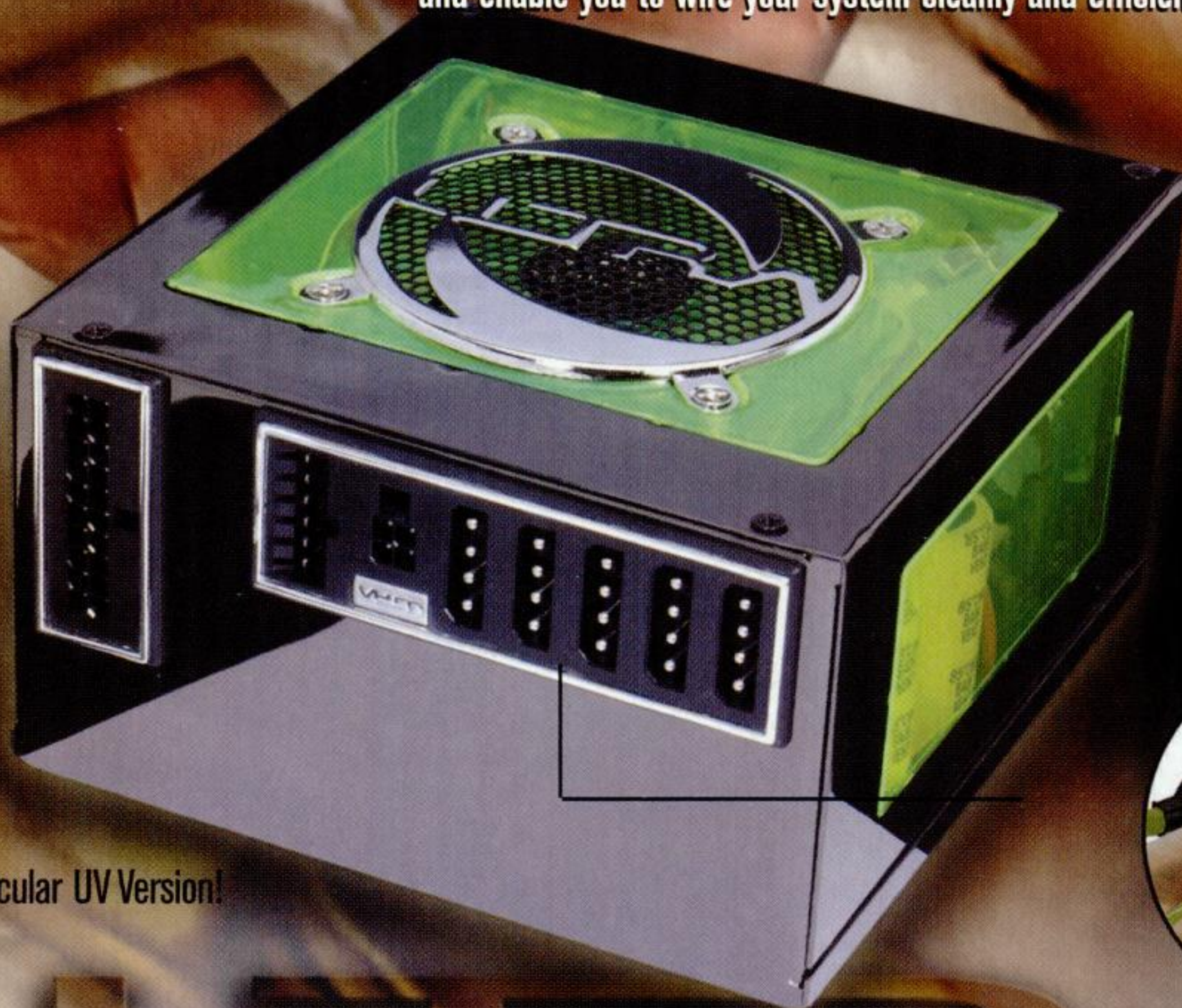


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